

APC

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Inside the next wave
of PCs, page 120

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DDR-2, PCI Express, Wireless USB & more

AUSTRALIAN PERSONAL COMPUTER

MASSIVE

Mobility guide

All systems and accessories

Tested: 34 Notebooks, 6 PDAs,
9 Smartphones and 4 Tablets, page 77

Go wireless

Unplugged at high speed

11 of the latest 802.11g
access points compared, page 70

DVD authoring

From editing to disc production

6 suites rated for your needs, page 62

Inside the Kazaa raid

APC was there. Full report, page 20

More inside APC this month

On Test, page 39: 9 pages of the latest products. FileMaker Pro 7, Dell Inspiron 9100, Apple iPod mini, ELSA videocards, AMD Athlon FX-53, WinZip 9.0, Director MX 2004 and more.

Workshop, page 127: Build a search engine with Python, ALSA (Advanced Linux Sound Architecture), SmoothWall firewall, implementing TrackBack and PingBack, Windows deployment (part 1 of 3), Windows XP page file optimisation.



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Full CD contents on page 8

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05

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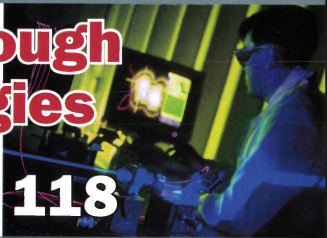
This month's cover stories



Breakthrough technologies

Forget faster clock speeds and wider screens, research labs are burning the midnight oil to re-engineer the entire PC with a wave of cutting edge technologies. *William Maher and Dan Warne* look at the latest innovations.

118



Mobility guide

There's never been a better time to arm yourself for mobile deployment. APC has enlisted a battery of portable devices for computing on the go, including notebooks and accessories, Tablet PCs, handhelds and Smartphones.

77



Go wireless

Wireless networking is booming in home and office environments. *Nick Race* puts 10 wireless access points on the hot spot.

70

20

DVD authoring

Want to preserve your latest video masterpiece for posterity? *Serdar Yegulalp* tests six DVD authoring packages and finds something to suit every budget.

62



Inside the Kazaa raid

The Australian music industry says it's about to blow the lid on the complex web of companies behind Kazaa. *Garth Montgomery and Dan Warne* investigate.

20

Plus

Talk is cheap

Increased uptake of broadband and demand for low-cost phone calls have pushed telcos to invest in voice technology. *David Braue* talks up VoIP.

23

28



OnTest

Reviews

FileMaker Pro 7

The desktop database heir apparent edges just that bit closer to becoming undisputed king

AMD Athlon FX-53

ELSA video cards

Dell Inspiron 9100

WinZip 9.0

Macromedia Director MX 2004

S-Media CoCoPod

Apple iPod mini

Forward Solutions Migo

ASUS Pocket Wireless Access Point WL-330 and more...

Labs Challenge

Wide-screen DLP and LCD projectors

Home theatre has never been so affordable. *Troy Michlmayr* examines four LCD and DLP projectors.

802.11g wireless access points

Wireless networking is booming in the home and office. *Nick Race* puts 10 wireless access points to the test and more...

Full index page **39**

Need to Know

13

- Major ISPs are considering building their own DSL networks after the latest stoush with Telstra over wholesale pricing.
- Despite the strength of the local currency, Aussie consumers continue to pay more for software than those in the US.
- Technical problems are causing headaches in the quest for ever-faster hard disk platters.
- Eric S. Raymond is promoting the cause of hackers, one T-shirt at a time.

Full index page **13**

WORKSHOP

Windows system imaging

In the first of a three-part series, *Serdar Yegulalp* explains the preliminaries of system imaging to deploy Windows to multiple machines.

Optimising Windows XP page 10

When it comes to achieving maximum performance with XP's page file, it's not the size that matters but what you do with it. *Bert Smith* demonstrates.

Setting up a search engine with Perl page 10

Whether you're running a large Web site, or your own personal page, a search engine will bolster its usefulness. *Dave Carter* explains.

Online communities, part 2

Now that your community is up and running, it's time to get your members interacting. *Jarrold Spiga* explores forums, polls and newsletters.

Linux audio

Have you heard the noise about the Advanced Linux Sound Architecture in the new kernel 2.6 for Linux? *Andrew Lau* brings out your inner audiophile.

SmoothWall Express page 11

Nick Race demonstrates how SmoothWall Express 2.0 can protect your computer or network from attack.

and more...

Full index page **127**

TECHLIFE



Games

V8 Supercars 2; Unreal Tournament 2004.

156

Books

An Introduction to Web Matrix; ASP.NET Development for Beginners; Microsoft Office 2003 All in One; Mike Meyers' A+ Guide To Managing and Troubleshooting PCs; Google, Amazon and Beyond: Creating and Consuming Web Services; Dr Mac: The OS X Files.

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MOBILITY POWER KIT

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Tablet PCs

Tools to read eBooks, manage networks, customise the desktop and animate on-the-fly with your Tablet PC. Includes trial versions of FranklinCovey TabletPlanner 3.0, Optimal Desktop Pro 3.0 and Ink AniEd 1.1.

KNOPPIX 3.3 CD

KNOPPIX 3.3 is a Debian Linux-based operating system that runs entirely from CD — no hard drive installation required. It recognises and supports many types of graphics cards, sound cards, SCSI devices and other peripherals connected to your PC.

KNOPPIX is useful as a Linux demo, a rescue system, or even as a portable operating system. It uses transparent decompression to extract up to 2GB of data from the CD.

This month's KNOPPIX 3.3 CD includes a whopping 1,700MB of compressed software and system files. It comes with everything you need including: KDE 3.1; X Multimedia System (xms) with MPEG video, MP3 support and the Ogg Vorbis Audio Player; Internet access software; GNU Image Manipulation Program (GIMP) v1.2; a variety of data rescue and system repair tools; OpenOffice 1.1 and much more. Altogether it contains over 2,000 executable programs, utilities and games.



Full CD index

CD 1

Full-working versions

- NMS for PDA Professional 2.0 — full-working version
- NMS special offer
- ShellToys XP 2.0.2 — full-working version
- ShellToys XP 4.1 — trial version
- ShellToys XP special offer

On Test

Reviews

- MindManager X5 Pro
- Ulead DVD MovieFactory 3 Disc Creator

Lab's Challenge

DVD authoring

- Adobe Encore DVD 1.0 Tryout
- MediaChance DVD-lab 1.3
- TMPGEnc 2.521

- Ulead DVD Workshop 2 Tryout

Mobility Power Kit Laptops

- ClearTweak 2.6
- Colligo Workgroup Edition 3.2
- MaxiVista 1.0.14
- Microsoft Reader for Desktop and Laptop PC 2.1.1
- MultiNetwork Manager 7.0
- Password Notebook Plus 1.2.0.9
- Symantec Mobile Essentials Personal Edition
- SyncBack 2.2.1
- Taryllyn 2.1.555
- Volt 1.2

PDA/Smartphones

- µBook 0.8m
- AvantGo Mobile Internet Service 4.2
- BackupBuddy 1.52
- Battery Pack 2004 5.3

- Download Documents To Go Premium Edition 6.005
- easySMS 1.55
- FileZ 5.3.2
- FontBucket 1.46
- ftxBrowser 0.1e
- McPhling 5.40
- Microsoft ActiveSync 3.7.1
- Microsoft Reader for Pocket PC 2.2.3
- Pocket Informant 5.01
- Pocket MVP Player
- PocketTV Classic for Pocket PC 0.12.13
- RegKing v1.6
- Resco Explorer 2003 5.00
- WisBar Advance 1.2.2.1

Tablet PCs

- Colligo Workgroup Edition 3.2
- FranklinCovey TabletPlanner 3.0
- Ink AniEd 1.1
- Microsoft Reader for Tablet PC 2.5

- MultiNetwork Manager 7.0
- Optimal Desktop Pro 3.0 r141

Toolkit Linux

- Adobe Acrobat Reader 5.0.8
- cdrtools 2.0.0.3
- Firestarter 0.9.2
- Gaim 0.75
- gFTP 2.0.16
- GIMP 1.2.5
- Linux Kernel 2.6.4
- MPlayer 0.92
- RAR for Linux 3.30
- RealPlayer 8.0
- WebMin 1.130
- XMS 1.2.10
- Browsers
- Microsoft Internet Explorer 6.0 SP1
- Mozilla 1.6
- Safari 1.0

Realsoft 3D 4.2

Full version

Create and animate incredible 3D images with this all-in-one modelling and rendering suite.

Realsoft 3D 4.5 Special Edition for Linux is also included. If you're not quite sure where to get started, read our Realsoft 3D Workshop on page 150.

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NMS for PDA Pro 2.0

Full version

Lockdown your PDA and keep it safe from prying eyes with this security tool that password protects your device and encrypts data. The ActiveSync connection is also secured, so only PCs with NMS for PDA will be able to connect to your handheld.

For Pocket PC 2002 and 2003

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Keep your PC safe from hackers, malicious scripts and application exploits with this full-featured firewall solution. It also features advanced parental controls and the ability to block Internet searching of banned words.

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As sold for
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CD 2

Full-working versions

Norman

- Norman Personal Firewall 1.3 — full-working version
- Norman Privacy 3.0 — full-working version
- Norman Personal Firewall 1.4 — trial version
- Norman Virus Control 5.7 — trial version
- Norman special offer
- Realsoft 3D 4.2 for Windows — full-working version
- Realsoft 3D 4.5 Special Edition for Linux
- Realsoft 3D 4.5 for Windows — trial version
- Realsoft 3D upgrade offer

Workshop
Linux audio

- ALSA Driver 1.0.3
- ALSA Firmware 1.0.3
- ALSA Library 1.0.3b
- ALSA OSS Compat. Library 1.0.3a
- ALSA Tools 1.0.3
- ALSA Utilities 1.0.3
- xine 1-3c3b
- XMMS 1.2.10
- Norman Privacy 3.0 — full-working version
- Norman Personal Firewall 1.3 — full-working version
- Norman Personal Firewall 1.4 — trial version
- Norman Virus Control 5.7 — trial version
- Norman special offer
- Realsoft 3D 4.2 for Windows — full-working version
- Realsoft 3D 4.5 Special Edition for Linux
- Realsoft 3D 4.5 for Windows — trial version

- Realsoft 3D upgrade offer
- Searching with Python Search Engine
- Smoothwall Express 2.0
- System Imaging
- BootIt Next Generation 1.61e
- NewSID/SIDChanger 4.0

Need to Load

Windows

- Actual Windows Guard 2.5
- Avant Browser 9.01.118
- Cloak 7.0
- Forte Agent 2.0
- POPFile 0.21
- TurboGo 5.0
- UCmore XP 4.5.2
- VLC Media Player 0.7.1
- WinZip 9.0

PC Games

- Gangland single player demo
- KillSwitch demo

Toolkit

Windows

- Adobe Reader 6.0.1
- Ad-aware Standard 6 Build 181
- DirectX 9.0b
- DivX Video Bundle S.1.1
- ICQ Pro 2003b build 3916
- PowerPoint Viewer 97
- RealOne Free Player 2.0
- Spybot — Search & Destroy 1.2
- Winamp 5.02 Free
- Windows Media Player 9
- WinZip 9.0
- WS_FTP LE S.08
- ZoneAlarm 4.5.538

CD 3

KNOPPIX 3.3 CD

Complete Linux operating system on a bootable CD.



MAY 2004

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Acting Editor Garth Montgomery gmontgomery@apcmag.com
Technical Editor Matthew Overington mowert@apcmag.com
Journalists David Lin dlin@apcmag.com,
 William Maher wmahe@apcmag.com,
 Jarrod Selig jselig@apcmag.com, Dan Warr dware@apcmag.com
Contributors David Brown, Anthony Casanova, David Emberton,
 Denis Gallagher, Patrick Gray, Justin Krasak, Andrew Lau, Graham Lauren,
 Versa Meskanen, Tony Michmayr, Asher Moses, Jennifer O'Connell, Valens Quinn,
 Nick Race, Bert Smith, Stephen Withers, Seodan Yegulalp
Editorial Coordinator Cathy Parkes csparkes@apcmag.com

DESIGN

Senior Graphic Designer Patrick Kirsch
Graphic Designer Craig Curral
Photography Robert Clark, Patrick Kirsch, Chai Images, AAP

PRODUCTION

Senior Sub Editor Peta Dugan
Sub-Editors Stuart Hitchings, Jennifer O'Connell, Tamara Plesner
Production Controller Julia Wren

MULTIMEDIA

CD Manager Nola Camden ncamden@apcmag.com
CD Coordinator Lachlan Grant lgrant@apcmag.com
Web and Database Manager Dan Lowden dlowden@apcmag.com
Web Coordinator Laura Kane lkane@apcmag.com

ADVERTISING

National Advertising Manager Simon Smith ssmith@apcmag.com
NSW Advertising Manager Martin Brown mbrown@apcmag.com
Senior Account Manager Jodie Eichells
Advertising Sales VIC Sami Ray
Advertising Sales NSW Brooke McGilvray
Advertising Production Susan Harrison
Advertising Enquiries (02) 9267 8968

MARKETING

Marketing Brand Manager Gabrielle Hegarty ghegarty@apcmag.com
Marketing Assistant Melissa Oei Popsa mopopsa@apcmag.com

ACP

CEO John Alexander
Group Publisher Phil Scott
Associate Publisher Lucinda Mitchell
Advertising Director of Business Publications Angus MacGregor
Advertising Sales Director Cameron Hay

CONTACTING US

Email aac@apcmag.com
Web www.apcmag.com
Phone (02) 9268 9111
Fax (02) 9267 4908
Postal PO Box 4086, Sydney NSW 1028
Street Level 9, 175-183 Castlereagh Street, Sydney

REPRINTS AND COPYRIGHT

Contact Cathy Parkes
Phone (02) 9268 9111

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Intel hertz

But is the pain self-inflicted? As consumers become more sophisticated, Intel is shifting its marketing strategy away from Megahertz and chip speed.

Intel is worried. For years, the self-styled IT leader has touted Megahertz and speed as the ultimate measure in chip performance. Now it's backed away and next month will introduce a new, number-based naming scheme for its chips (see page 15). This new naming scheme acknowledges that a number of features contribute to chip performance.

Three years ago, small-time rival AMD took the focus off speed to consider other chip features such as FSB and L2 cache. Intel bucketed the concept at the time, ignoring the reality that chip speed is only one part of an increasing array of components contributing to overall system performance. That reality was not lost on users though, as GPUs, motherboards and memory increasingly took centre stage alongside the CPU feature set.

So why has Intel changed its tune? And, more importantly, why now? The chip giant can foresee a huge loss in brand equity. The days of "Intel Inside" — signifying that the ultimate component was powering a device — are fading.

Intel has envisaged a chipped consumer world where almost everything electronic will contain a processor. Problem is, it's only one component and increasingly sophisticated users will care less about the speed of the chip running these electronic devices than their overall functionality.

This hasn't required a huge amount of foresight on Intel's part. Office users have had enough horsepower for the last four years to run office apps, a Web browser and email. IT managers only ever talk about stability and manageability. In the words of 52 analyst Bruce McCabe: "Megahertz just isn't on the shopping list."

In fact, Megahertz has only remained on the shopping list of the uninformed. Anyone not buying PCs from large retailers knows that clock speed outstripped apps long ago. The problem for Intel is that this has prolonged the life of the PC. According to Gartner analyst Andy Woo, "The average life span of a PC today is more than four years, compared to just three just a few years ago."

Intel's famous Moore's Law is actually killing it, as apps can't keep up with chip development. Nor

should they for the bulk of users, whose main needs from their computers are email, Web browsing and using basic productivity or image management apps.

This is not what Intel wants to hear. At an IDF last year, Intel president Paul Otellini trumpeted that 4GHz would be achieved by the end of 2004. The silence was overwhelming. No-one was impressed. Otellini's mouth said nothing, but his face suggested the loss of about a zillion share options.

Intel's new naming scheme is the first step on its path to a common processor core for notebook and desktop chips by 2007. Code-named Merom, the core is derived from the Pentium M line and aims to bring the same kind of energy efficiencies already found in notebooks to the desktop. Since mobile chips are slower than desktop chips, Intel is aiming to ease the marketing pain later by

removing the focus from speed now.

Intel execs are hoping to repeat the marketing success of Centrino by focusing on "features". They hope consumers

Intel's chips were never better, faster nor more compatible than AMD's

will buy the message that chips are "richer" now, rather than slower and more expensive.

The bigger problem for Intel will be getting anyone to notice. For the mass market, a focus on functionality will outweigh Intel's FUD about buying a so-called standard with far-reaching compatibility. The FUD message was a crock then, and it'll be a bigger crock going forward. And Intel knows it.

Intel's chips were never better — certainly never faster, nor more compatible — than AMD's. But it massively outspent its rival when it came to marketing and secured an 85% market share. AMD remained on the fringe, for enthusiasts.

Intel's new naming scheme confirms that the battle for consumer mindshare is about to get tougher as an increasing number of devices carry chips, and the chip is acknowledged as just one aspect of a unit's performance. And as chipped devices become increasingly mainstream, mass consumers will really only care about functionality, while device manufacturers will be less swayed by the marketing claims of big spenders such as Intel.

gmontgomery@apcmag.com

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Need to Know

News, views and analysis from the IT world

ISPs threaten to dump Telstra

ISPs are considering ditching Telstra and setting up their own broadband networks, reports Dan Warne.

Major ISPs are considering building their own DSL networks following the latest stoush with Telstra over wholesale pricing.

Primus is considering using some of its substantial capital reserves to roll out a next-generation ADSL2+ network across Australia, according to the company's product manager Campbell Sallabank. It would offer the fastest broadband speeds ever seen for residential users: up to 24Mbit/s.

This would give Primus the capacity to offer pay TV, voice telephony and faster-than-cable broadband Internet over a single DSL service, posing a significant threat to Telstra's cornerstone voice telephony revenues and digital pay TV gamble. Sallabank would not put a time frame on the Primus plan, but hinted that it may be as soon as next year.

SingTel Optus, Primus, Internode, iNet, Request and AAPT already have their own DSL hardware installed in telephone exchanges. With some of these companies seriously considering extending their DSL networks to

share and got caught up in an unexpected situation. "This whole thing has been about toying with the competition regulator in order to rebuild BigPond's market share. [But] the plan failed, and the ACCC is demanding immediate wholesale price reductions."

Sallabank commented that broadband prices are under such pressure from BigPond's low retail pricing that many ISPs are only surviving because their profitable dialup customer bases are cross-subsidising broadband revenues. "Prices are being squeezed by Telstra, and because Telstra can't be trusted (as a wholesale supplier), we'd rather control our own destiny operationally and commercially," he said. "Building our own network is one obvious way of doing that."

Primus is already using its DSL hardware in 40 Telstra exchanges to service residential customers in those areas, Sallabank said. Its DSLAMs are capable of providing DSL at speeds of up to 6Mbit/s, though these services are priced for business use.

Because Telstra can't be trusted, we'd rather control our own destiny operationally and commercially

home users, Telstra may be falling on its sword in clashes over wholesale broadband pricing.

The telco has been fighting with the ACCC and rival ISPs since BigPond released \$29.95 broadband plans. This led Telstra's competitors in the broadband market to complain that Telstra's retail plans were substantially cheaper than the wholesale prices they were paying for use of Telstra's network.

The competition regulator put Telstra on notice in March after finding it was acting anti-competitively. Telstra faces paying multi-million dollar fines and compensation to its rivals if it doesn't lower wholesale prices to the ACCC's satisfaction.

Internode's Simon Hackett said he believed Telstra panicked over retail broadband market

Optus is in the strongest position to benefit from building its own DSL network. The company is well funded, has a huge telephony and dialup Internet customer base, and would ultimately be able to resell DSL on a wholesale level to other ISPs. And its marketing power is unparalleled with the exception of Telstra.

But it would take a substantial investment to compete head-to-head with Telstra, which already has coverage in 1,047 of the country's 5,000 exchanges. Optus has its own DSL hardware for business customers in 127 exchanges, but is considering expanding that for use by residential customers.

"It's a real possibility... if we were able to improve the customer experience, differentiate

Continued on page 14 ►



► Telstra bypass: ISPs are touting up to 24Mbit/s.

Also in Need to Know:

18

Opinion

Dan Warne believes Telstra is playing a game of chicken with the ACCC.



Edward Mandla considers that the long-term cost of offshoring ICT jobs far outweighs the short-term savings.



20

Inside the Kazaa raid

The Australian music industry says it's about to blow the lid on a complex web of companies, including Kazaa.



28

Talk is cheap

Increased uptake of broadband and demand for low cost phone calls have pushed telcos to invest in VoIP.



30

Watchdog

Switching ISPs should be a painless experience, right?



32

Shipping News

First looks at the latest products.



34

Epinions

APC readers have their say.



Aussie software price gap no myth

Are Australians paying too much for PC software? Patrick Gray does the sums.

Australian consumers continue to pay more for software than those in the US, despite the stellar performance of the local currency. Software vendors insist they aren't profiteering. Rather, they say a combination of higher reseller margins, shipping costs, lower volumes and the GST are to blame.

Microsoft Australia's licensing marketing manager, Thomas Kablau, said the software giant tries to stick as closely to the US prices as possible. "Generally we use the US pricing as a benchmark, convert [costs] into Australian dollars and adjust accordingly," he told APC.

Scanning the company's Web sites, that claim seems somewhat dubious. Microsoft's Enterprise MSDN subscription, for example, is priced at US\$2,199 in the US. At the time of writing that converted to AU\$2,890, yet the same kit costs \$3,817 locally, meaning that Australians are paying over 30% more.

Kablau argued that software will always be more expensive in Australia due to the lower volume of sales in the relatively small domestic market. "The extra percentage we have on MSDN is what we have to incur on the lower volumes," he said.

But it's not just the difference in sales volumes that keeps prices higher, according

to Peoplesoft Australia's director of industry and product marketing, Ray Kloss. Costs associated with regional operations, such as payroll and support, don't fluctuate with currency movements, so full savings can't always be passed on to Australian consumers. "In some ways pricing is independent of currency... the bigger issue is wearing the risk of currency swings," he said.

Damien Bootsma, a systems engineer with Borland, said the software maker's US office sets the prices and the Australian syndicate comes up with its own (regularly updated) prices based on the exchange rate. However, Bootsma pointed out that support costs—which are priced as a percentage of the software licensing fee—are somewhat more fluid due to local overheads that don't fluctuate with currency.

The current situation is a far cry from 2001, when the Business Software Association of Australia (BSAA), a consortium made up of major software companies, moved to debunk the idea that Australian prices are higher.

It cited a survey of 62 products from vendors such as Adobe, Autodesk, Corel, Lotus, Macromedia, Microsoft, Symantec and others as proof Aussie software shoppers were not being short-changed. The survey found that "on average, business software prices in the US were only 3.54% lower than average



► Aussie consumers: still saving for Windows 95.

Australian prices of the same products during the period of the study," which took place between October and December in 2000.

"Many of the most popular business programs were on par or cheaper in Australia than in the US," a BSAA statement read.

One disgruntled Australian buyer, David Macaulay, summed it up in a letter to APC when he wrote: "All I can conclude is that Microsoft Australia [is] taking unfair advantage of current exchange rates, to the detriment of Australian consumers and business."

► Continued from page 13

our service and improve our business returns," Scott Lorson, marketing director for Optus Consumer and Multimedia, told APC.

Optus could offer faster DSL Internet if it ran its own network, he said, adding that having full control over the reliability of its network, rather than relying on Telstra, would be a bonus.

Telstra told APC that it had already reached price agreements with most of its customers and that some ISPs were being "opportunistic" in using regulatory action in an attempt to get lower prices. "We have already reached pricing agreements with the top 12 ISPs by customer volume, which covers 80% of DSL end-users," claimed Telstra spokesperson Liz Jurman.

RequestDSL CEO Phil Sykes said the media had focused too much on wholesale pricing for Telstra DSL port access, and that other

underlying costs were also stifling competition in the marketplace. For infrastructure providers, access to copper phone lines was a "distorted cost."

"You can put a DSLAM in an exchange, but the ongoing cost of renting [access to each customer's copper phone line] is still very high, and unless something breaks as a result of this competition notice, it would be difficult to sustain in the long term," he said.

"The ACCC is in a tough spot: it has to ensure fair retail prices for end-users, but it also has to make infrastructure-based competition possible for healthier price and feature competition across the whole industry."

Inside info

ADSL2+: www.rd.francetelecom.fr/en/technologies/ddm200306/techfiche3.php

Stacking up the speeds

0.25

Telstra-based ADSL 256Kbit/s

0.5

Telstra-based ADSL 512Kbit/s

1.5

Telstra-based ADSL 1.5Mbit/s

8

DSL specification's max speed 8Mbit/s

10

OptusNet/BigPond Cable 10Mbit/s

Primus' proposed ADSL2Plus 24Mbit/s

24

Megabits per second

Intel's chip switch unveiled

Can Intel solve the CPU's image problems by dropping gigahertz ratings?

Intel is attempting a new approach to processor marketing in a bid to resolve confusion over current CPU features and the number of new technologies on the horizon that will affect chip performance.

With chips already somewhat difficult to compare within each manufacturer's range, let alone between different brands, Intel is now adopting its own three-digit codes for marketing CPUs, rather than solely relying on gigahertz. AMD moved away from clock speed classifications in 2001, instead preferring to use its own model numbers.

Under Intel's new numbering scheme there will be three tiers of chip ratings: the 300 series for Celeron, 500 for Pentium 4, and 700 for the Pentium M notebook chip. The model numbers will increase in increments of five to indicate features including frontside bus speed, cache and clock speed.

For instance, a Pentium 4 2.8GHz with 533MHz frontside bus and 512KB cache might be given a model number of 500. The same CPU with an 800MHz frontside bus might be called the Pentium 505.

"Selling on gigahertz alone was starting to become an inaccurate description of CPUs," said Intel marketing spokesperson Daniel Anderson. "It's recognition that performance isn't about megahertz anymore."

Intel is battling to juggle a growing number of chip architectures, including the Pentium M which operates at significantly lower clock speeds than its desktop equivalent. In some cases, manufacturers have resorted to using desktop chips with their more impressive clock speeds in notebooks. At the time of writing, Intel also had four different CPUs running at 2.8GHz, each with different benchmark ratings.

Notebook processors will be the first to get the new marketing treatment when Intel's Dothan chip is released in May or June this year. Dothan is the next generation Pentium M chip and is built using 0.90nm silicon technology.

While the new system will help clear up immediate confusion, there is no doubt the playing field is shifting significantly for CPU technology. Processors are increasingly battling other PC components for prominence in consumer's minds. The CPU is no longer the

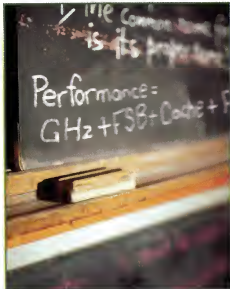
weakest link in the performance chain, with other factors affecting performance including battery life, bus speed, RAM speed and the type and speed of GPU.

Compounding the issue is a host of new technologies being planned in chipmakers' labs. Over the next 12 months, Intel will add to its CPUs dual-core technology and onboard chip security, as well as 64-bit extensions to its Xeon processors.

The new numbering system also further muddies the waters between Intel and major chip manufacturing rival AMD. While both companies have moved away from using clock speeds, the two have chosen different approaches — Intel's new system provides a way of comparing feature sets within one CPU platform, whereas AMD's chip names designate relative clock speed performance such as 3200+.

Confused? You're not alone. One discussion thread on Slashdot had exasperated enthusiasts debating an idea for their own "universal cross-platform benchmarking method".

Opinion remains mixed on Intel's approach. Analyst group Gartner, for instance, predicted the new numbers will be largely ignored by consumers. "Higher numbers indicate more features, not increased performance, and users will inevitably be confused. The



► **Juggling specs:** Intel must find new ways to manage increasingly varied CPU features.

numbers don't explicitly reflect clock speed, and users will have to look up tables to interpret them." Hardly an ideal situation.

Perhaps the most telling sign of a shift in CPU buying attitudes is the lack of excitement over expectations that Intel will break the 4GHz mark by the end of the year. Two years ago that would have been big news, today there's hardly a whisper.

William Maher

Microsoft reloads Windows XP

Microsoft looks like increasing its focus on Windows update packages over the next few years in an attempt to fill the gap as customers wait for Longhorn.

With the Longhorn operating system expected to arrive in 2006 (at the earliest), talk is increasing about what to do in the meantime, including the possibility of a new update dubbed Windows XP Reloaded. While no details have been announced, the news throws doubt over Microsoft's previous claim there would be no interim releases before Longhorn.

"We are examining ways to continue to add value to the current Windows XP platform," said Danny Beck, product manager for Windows at Microsoft Australia.

By next month, Microsoft will also have added new Windows features with the release of Windows XP Service Pack 2, including

pop-up blockers and a new Security Center. The changes are significant in that Microsoft had previously promised that no new features would be introduced in Service Packs.

SP2 could be the first taste of Microsoft's willingness to keep new XP features arriving in the run-up to Longhorn's release, especially if other news is anything to go by. Microsoft officials have confirmed other updates are also now on the pre-Longhorn drawing board, notably an upgrade to Windows Server 2003.

Talk of trickling out new features follows delays in a number of Microsoft's major long-term projects. This includes the next release of SQL Server and Visual Studio .NET, both of which have been pushed back to 2005. In the meantime, intermediate releases in the shape of feature packs or interim updates look like becoming more common.

William Maher

Beyond 7,200rpm

Technical problems are causing headaches in the quest for ever-faster hard disk platters.

Sick of waiting for your PC to rip a load of MP3s or do a batch file conversion? As CPUs and memory get faster, CPU cycles are going to waste while your PC makes I/O requests to your hard disk.

The obvious solution is to increase drive speed, but increasing revs per minute from the glass disk platters is proving difficult. Experts suggest drive speeds will max out at 15,000rpm, compared to 7,200rpm in most PCs today.

"We don't expect them to go beyond 15,000rpm — there's no point," said IDC storage analyst Graham Penn.

Spinning a disk at high speed within the tight confines of a drive bay isn't as easy as it sounds. As disks spin faster, they generate problems that include extra heat, wear on the motors and bearings, and pressure variations within the drive.

Increased storage density in newer drives such as Hitachi's 400G Deskstar 7K400 means that bits are packed more closely together,

making them harder to read at high speeds. This speed versus density trade-off means that higher speed drives are increasingly expensive to produce.

This isn't to say that vendors aren't experimenting with higher speeds. "We've actually looked at a 23,000rpm product," said Seagate global representative Michael Green, "but no-one wanted it. It was just too expensive [to produce]."

Users may not realise how weak a link in the speed chain the hard drive can be, especially taking factors such as the wait for the drive head to move to the right track on the disk into consideration.

Modern 7,200rpm disks have a seek time and latency of 8.9 milliseconds, during which time 26 million clock cycles can go to waste on a 3GHz CPU while the head of the drive is just getting to the right position to read data from the disk. To us, that 8.9ms goes faster than the blink of an eye, but to a CPU it's an eternity.

For the moment, the strategy of drive manufacturers is to keep increasing storage densities while keeping drive speeds relatively



► **Beyond red line:** how high can drive speeds go?

stable. According to figures from Seagate, "areal" density jumps 60% every six months. New I/O technology like Serial ATA 2 will also help alleviate some latency by improving bandwidth to and from drives.

Eventually experts say drives with 15,000rpm speeds will migrate from expensive SCSI servers to ordinary desktops, but after that latency pressures may make drive manufacturers look for a new solution.

William Maher and Jarrod Spiga

Data Dump

Number crunch

Proportion of Australian ISPs offering free or charged spam filtering service in September 2003

58%

(Source: Australian Bureau of Statistics)

Number of Australian Net users who have adopted a spam filtering product

2.5 million

Number of songs on sale from relaunched Napster site

5 million+

(Source: News.com)

Number of people sued in February by US recording industry for online music piracy

531

Desktop and notebook PC shipments in Q4 2003

618,827 units

(Source: IDC)

Total market growth for year

18%

Size of Intel's new digital home investment fund

US\$200 million

Cash and software promised by Microsoft for computer training program for developing nations

US\$1 billion

(Source: CDN)

5.2 million

▲ Number of Internet subscribers in Australia at the end of September 2003. Growth in Net users slowed from 11% in the six months to March 2003 to 3% in the following six months, according to the Australian Bureau of Statistics.

Quote file

"I'll be sending Linus the latest copy of Lindows OS"

— Michael Robertson, CEO of Linux software company Lindows, reacts to a suggestion from Linus Torvalds that Linux on the desktop is five to 10 years away for "normal" people.



One hacker's dream

Eric S. Raymond wants to promote hackerdom, one T-shirt at a time.

Five white dots on a black grid. It's not exactly an awe-inspiring sight, but it could be the world's first official emblem for computer hackers worldwide. Net geeks are already labelling sites with it, and you can find the emblem on T-shirts and coffee mugs.

A hacking emblem? The image is meant to help hackers recognise each other and "affirm common values", said the person promoting the concept, hacking's long standing ambassador Eric S. Raymond.

"By using this emblem, you express sympathy with our goals, our values, our way of living," he stated. Unfortunately the dots don't give you the rights to claim skills as a hacker yourself, he stressed. That is a title of honour that must be conferred by others.

The dots themselves represent a mathematical simulation called the "Game of Life". According to Raymond "about half" the test subjects exposed to the symbol got the reference.

Promoting the importance of hacking has turned into something of a lifelong quest for Raymond, who includes Bill Gates among his sparring partners. A self-described hacker historian, he has written seminal hacking titles including *The New Hacker's Dictionary* and *The Art of Unix Programming*.

Raymond's Web site (www.catb.org/~esr) includes a section called How to Become a Hacker, including tips such as "go to science fiction conventions" and study Zen.

He says he wants recognition for the early pioneers of hacking. This doesn't include virus writers or modern day password crackers, but the people who built the Internet, Unix and the World Wide Web. "[Hackers] dreams of freedom have changed the world everybody lives in," he enthused.

"The Linux folks have their penguin and the BSDers their demon. Perl's got a camel, FSF fans have their gnu and OSI's got an open source logo. What we haven't had, historically, is an emblem that represents the entire hacker community of which all these groups are parts," Raymond said.



Source: Slashdotmail.com

Recent attacks on the legitimacy of open source software have stung the Linux stalwart. In particular, SCO's legal threats against Linux users have triggered passionate responses on Raymond's Web site. One reads: "Linux is our work and our lawful property, the distillation of 12 years of hard work, idealism,

creativity, tears, joy, and sweat by hundreds of thousands of cooperating hackers all over the world. It's not yours, has never been yours, and will never be yours."

Raymond is also helping lead the fight against SCO, initiating a "No Secrets" campaign in an attempt to round up software coders who have had free access to proprietary Unix code. In an open letter to SCO posted on his site, he rejected the company's claims that Linux violates copyright law.

"Our licenses (the GPL and others) work with copyright law, not against it. We reject your attempt to portray our community as a howling wilderness of IP thieves as a baseless and destructive smear."

So why should Raymond care? "It's my job to think of these things."

William Maher

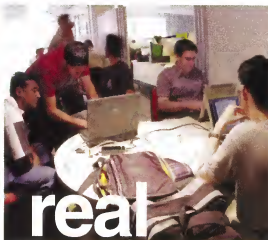
Geek king finally crowned

The APC reconnaissance team has finally tracked down Jason Currie, winner of APC's national Geek IQ test for 2004 (APC January, page 80), and bestowed upon him the Official Geek Crown.

For those who remember, the newly-dubbed royal was the only entrant to emerge with 100% correct. It was a truly brilliant achievement, one only marred by Currie's subsequent mysterious disappearance.

Fortunately, we managed to extract Jason from the Matrix long enough for him to brighten our day with this acceptance speech: "I never thought I would be the one sitting up in the geek throne, looking down at all the other geeks. First I would like to say thanks to APC for the cool stuff. Secondly, as it said in my Geek IQ certificate, all I need to do now is lighten up and get a life."

Thank you Jason, spoken like a true geek.



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Telstra's chicken run

Dan Warne



Telstra's been at it again: playing a game of chicken with the ACCC and sweeping the market clean of broadband competitors.

The furore is over Telstra's wholesale ADSL pricing: BigPond unexpectedly dropped its entry-level retail pricing to \$29.95 a month, but conversely neglected to reduce its wholesale pricing structure.

Although the company has now revised its pricing, it's making ISPs choose between two poison pills. There's the red pill, which offers keen wholesale pricing on high-speed plans but no possibility of ever profiting from the entry-level \$29.95 plans, which now have a \$29.70 wholesale price. Or there's the blue pill, which offers profitable pricing on the entry-level plans and painful pricing at the high end: a 1.5Mbit/s connection with 10GB of data would cost \$89.11 at wholesale.

Telstra knows it's holding all the aces: BigPond's new super-low pricing is popular with consumers. The telco giant knew all along it could simply jack up retail prices if the pressure got too hot, while at the same time painting the competition regulator as an out-of-touch bureaucracy and enemy of innovation.

After all, this underhanded tactic is tried and proven. When the Australian Competition and Consumer Commission (ACCC) charged BigPond with illegally undercutting its wholesale customers in 2001, Telstra simply hiked up retail prices and slapped usage caps on its plans. Customers caught out over that one still remember the pain.

New competition tsar, Graeme Samuels, has been talking tough, eager to show that he's no "toothless tiger".

"To advise the ACCC of a major change, in what is clearly a sensitive market, on the day it happens is not good enough. This

is particularly so when the relevant market is one that the ACCC has previously signalled its interest, in the clearest way possible, by issuing a competition notice," he said.

That competition notice was issued three years ago, when Telstra was selling its unlimited broadband service to the public for \$78 but charging ISPs over \$100 for the same thing. BigPond had few competitors at the time.

Although the ACCC declared that Telstra

was "in breach of the law", the commission repeatedly extended the competition notice deadline, ultimately choosing not to fine Telstra even one cent of the potential multi-million dollar fines it could have imposed.

This time round, the ACCC has acted more swiftly, issuing a second competition notice and demanding immediate wholesale price reductions.

In retaliation, Telstra has attempted to strongarm ISPs into withdrawing complaints with the regulator. ISPs who voluntarily entered into a pricing agreement before the end of March would be

Telstra knows it's holding all the aces: its new pricing is popular with consumers

"rewarded" by having the wholesale price-cuts back-dated to the day BigPond introduced its anti-competitive \$29.95 plan. Those who waited for a final decision by the competition arbitrator had to wait until May to get a discount.

Telstra clearly doesn't understand what competition law and public opinion is saying. It's time for the ACCC to speak a language Telstra understands. Bring on the \$10 million fine.

dwarne@apcmag.com

Offshoring: the next ICT panacea?

The long-term cost to industry and government of offshoring ICT jobs far outweighs the short-term savings.

Recent announcements by Telstra that projects involving hundreds of Information and Communications Technology (ICT) professionals will move offshore to India have galvanised debate on this highly sensitive issue.

Many believe the trend towards offshoring is inevitable, a symptom of the economic realities of globalisation and the need for organisations to reduce their costs to remain competitive. While I recognise that companies must be free to determine their own destiny, I believe executives need to learn from history. Offshoring is the new ICT panacea, and we know that such things regularly get hyped and take off before market reality intervenes.

This is an irresponsible approach because it's based on short-term gains for shareholders rather than the company's long-term health. Over the past few years, we've seen a short-term, cost-centre mentality applied to ICT departments, with organisations overlooking

the strategic aspects of ICT in favour of a strong focus on cost-cutting, process improvements and productivity gains.

ICT can deliver all these things, but it also plays a critical role in practically every strategic initiative a business undertakes. Until organisations recognise the strategic importance of ICT, they will fail to take advantage of their potential to set their business ahead of the competition in a global market.

The Australian Computer Society (ACS) recently released a report into offshoring. The report, by Whitehorse Strategic Group, states: "Where the outsourcing originally undertaken did not, for whatever reason, provide the cost savings that were envisaged, there are inevitable pressures within the client organisation to seek out lower cost solutions within the same outsourced framework, rather than to acknowledge the original error and try to bring the process back within the client organisation."

It's difficult to reintroduce ICT skills and functions after they've been outsourced, but companies wanting to control their strategic operations will need to do so. Consider how

much more difficult it will be to bring back these functions once they've been sent offshore.

On top of this, the associated economic and social costs must be factored into any company's decision to send jobs overseas. Companies making these choices on the basis of short-term savings alone may be setting themselves up for potential negative publicity and unpredictable customer service levels.

For instance, the high unemployment rate amongst ICT professionals indicates that jobs sent offshore are not easily replaced. As a result, Australia bears the brunt of millions in lost taxation revenues and reduced economic activity, as well as the increased drain on government coffers for social security benefits. We must never forget that every job lost represents a personal human tragedy and such a decision cannot be taken lightly.

Edward Mandla is national president of the Australian Computer Society. Email info@acs.org.au or visit www.acs.org.au



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Photography by Brendan Read

Inside the Kazaa raid

Kazaa HQ: on a stinking hot morning in early February, two ARIA lawyers, two private investigators, two forensic investigators and a court appointed solicitor (bottom right) presented a Federal Court order at Kazaa HQ in Cremorne, NSW. Kazaa staff and management were shocked and surprised that their arch nemesis was now in the building to collect evidence against them for civil proceedings. Within the hour Kazaa's lawyers arrived (middle row, second from left) as well as their PR reps. The houses of Sharman CEO Nikki Hemming (top right) and CTO Phil Morle (bottom left) were also raided. Investigators gathered evidence for over 12 hours.

The Australian music industry says it's about to blow the lid on the complex web of companies behind Kazaa. Garth Montgomery and Dan Warne investigate.

Legal action equals business as usual for Kazaa owner Sharman Networks, but even CEO Nikki Hemming was surprised when Australian music piracy investigators burst through the doors of Kazaa's Cremorne offices in NSW armed with a court-sanctioned search warrant.

Organised under a cloak of absolute secrecy, the controversial "Anton Piller order" granted by the Federal Court gave lawyers and forensic analysts for the Australian

Recording Industry Association (ARIA) legal authority to gather evidence from the Kazaa premises without police being present, including the right to make binary copies of hard drives. An Anton Piller order is granted when a judge is persuaded that there are reasonable grounds evidence may be destroyed if advance notice is given.

The music industry's aim was to create a digital "snapshot" of the entire system in operation at one moment in time. Music Industry

Piracy Investigations (MIPI) general manager Michael Speck told APC his aim was to prove in court that Sharman Networks could control and manipulate the network, debunking its claim of simply being a neutral technology provider.

Hemming didn't stick around for the duration of the raid. She fled through a side door of the building, escaping in a silver Porsche Boxster with "SHARE" number plates to her luxury home in Castle Cove. When she arrived, forensic analysts were already at her house, analysing hard drives of servers found inside. She was told to make herself comfortable in the front yard.

The raid was conducted simultaneously at Telstra, iHug/iNet,

University of Queensland, University of NSW, bandwidth wholesaler NTT Australia, Altnet (the rights-managed content distribution company partnered with Kazaa), and Akamai, the worldwide content mirroring network with high profile clients like Apple Computer and Microsoft. All were subjected to the Anton Piller order so the music industry could capture a digital snapshot of the Kazaa system.

Investigators also searched the homes of Sharman Network's CTO Phil Morle, and Brilliant Digital Entertainment and Altnet's CEO Kevin Burmeister as they sought to gather evidence on the involvement of these individuals in the operation of the Kazaa network.

Sharman Networks was outraged that the music industry was granted the right to search its headquarters, those of its business partners and the homes of its senior executives. It argued that music industry lawyers had deceived the Federal Court's Justice Wilcox by not giving him all the facts, including that Kazaa had been given a clean bill of health in Dutch courts. That ruling was based on the Sony Betamax precedent, which ruled that makers of VCRs were not responsible for their use by pirates.

Perhaps it was Justice Wilcox's irritation at being accused of being duped, or simply that Kazaa's claims weren't relevant in the Australian jurisdiction, but the court rejected the motion to dismiss the Anton Piller order out of hand.

Sharman was equally enraged that media, acting on anonymous tip-offs, were on-site at Kazaa's offices to witness the raid. "They wrote to MIPi's lawyers about its media activity and MIPi's lawyers were equally interested in the catering arrangements for journalists at the raid," Speck said. "Curiously, the issue went away."

A former Detective Sergeant in the NSW Police Service, Speck said he is approaching the Kazaa investigation using the same methods he'd apply to a police investigation, and wouldn't exclude

using undercover surveillance, informants and covert operations to deconstruct the complex structure of the organisation.

While he has suspicions as to who is behind the money backing Kazaa ("they can afford to send a QC and seven lawyers to court"), Speck won't be drawn. The company is incorporated in Vanuatu, where simply asking who owns a company constitutes a criminal offence. Hemming claims this is for "tax efficiencies," but the music industry argues that the company is set up to deliberately obfuscate its legal ownership structure in order to avoid prosecution.

The music industry is also suspicious of Altnet's involvement with Sharman Networks. Altnet, which sells pornography, computer games and music via the Kazaa network, was added as a defendant to the Australian legal action following the raids. In a US securities filing, Altnet admitted it had the right to negotiate deals on behalf of Sharman Networks, a fact that the industry alleges is a suspiciously cosy arrangement, raising questions about Altnet's true influence within the tangled web of companies surrounding Kazaa.

UNDER ATTACK

The case against Kazaa marks a milestone in the recording industry's attempts to stop music piracy on the Internet. For the first time, the Australian labels have a very real chance of putting a dent in global piracy by arguing before the court that since Kazaa is headquartered and operating in Australia, it is liable for any copyright infringement, if proven, on Australian soil.

The industry alleges that Kazaa facilitates the distribution of 260 million pirated tracks a month. "You only have to multiply that by BigPond Music's price of \$1.89 per track to realise this is the biggest [alleged] copyright infringement in history," Speck pointed out.

Hemming argues that the music industry actually benefits

The history of P2P

MP3 format created by German company Fraunhofer-Gesellschaft.

Shawn Fanning creates Napster.

Recording Industry Association of America (RIAA) sues Napster.

Winamp's Justin Frankel invents Gnutella, an ad-hoc network with no central servers.

Napster ordered to stop distributing copyright material to its 60 million users.

FastTrack network (Kazaa) invented.

Napster settles for US \$26 million.

Kazaa sold for \$500,000.

Kazaa's new owner, Sharman Networks, incorporated in Vanuatu.

Maths genius Bram Cohen creates BitTorrent.

US Federal Court rules Morpheus and Grokster not responsible for actions of users.

Apple launches iTunes Music Store in US.

Australian recording industry sues four Sydney students for running MP3 WMA Land Web site, alleging theft of music worth \$60 million.

Kazaa's owners create another company in Vanuatu and shift assets into it. US music industry now suing an empty shell company.

RIAA issues over 1,000 subpoenas to ISPs to force them to disclose the names of P2P end-users.

The four Australian MP3 WMA Land operators receive suspended sentences, small fines and community service orders.

Telstra launches BigPond Music, which by March offers 500,000 legal songs for download.

Kazaa's Sydney HQ raided by music industry piracy investigators, forensic analysts and lawyers under Federal Court order.

Kazaa: the defence

APC: What can Kazaa offer the record industry, and how can both make money from peer-to-peer?

It is ironic that in the two weeks after the Australian subsidiaries of the major record labels launched legal action against Sharmar Networks — owner and distributor of Kazaa — two more independent record labels signed up through our business partner, Altnet, to license their catalogues for paid download. These companies are promoting and selling tracks ranging from Jimi Hendrix and James Brown through to the London Symphony Orchestra.

Why, as the major labels continue to litigate, do their independent counterparts actively license material? Simply because peer-to-peer (P2P) technology marks a new era of digital distribution that, with or without the major record labels, will continue to shape the way entertainment is consumed worldwide.

Two years ago Sharmar Networks and its partner Altnet entered the P2P market with a blueprint for a complete end-to-end licensing solution.

Our entire existence was based on the principle that rewards should be distributed to all stakeholders — artists, copyright holders, distributors and consumers.

Through Kazaa, every time an authorised, licenced file is downloaded and shared, the parties involved in creation and support are properly compensated. In total, licenced (copyright-protected) files, including music, games, films and software, are downloaded around 50 million times by more than 60 million Kazaa users each month.

For 18 months now, the major record labels have been presented with this licensing solution. They have rejected the opportunity to encrypt their music at source and distribute it securely through Kazaa. [These companies] continue to deliver music in a format that lacks any effective anti-copying technology, and now demand that applications such as Kazaa should somehow be able to mop up their mess online.

The major labels now consider music Web sites to be the Holy Grail of digital distribution. However, with rapid convergence of media, consumers today are looking for a much more immersing experience than audio downloads alone. With peer-to-peer, rich media content such as live concert videos, movies and games can be (and are) marketed to a global audience through one seamless storefront at a tenth of the cost of serving from a Web site. Record companies can reconnect with the buying public by offering an incredibly compelling "carrot," rather than continuing to alienate them with the litigation "stick."

In the mid-'80s, the major movie companies tried to eliminate the VCR through litigation. Video later became its single biggest revenue stream. Now, in 2004, entertainment companies are trying to do the same to peer-to-peer [technology]. I firmly believe that history will repeat itself — to the benefit of everyone.

Nikki Hemming is the chief executive officer of Sharmar Networks, owner and distributor of peer-to-peer program Kazaa.



Nikki Hemming

"P2P technology will continue to shape the way entertainment is consumed"

► from Kazaa: "The vast majority of the third-party research that's been done indicates that sampling product means more sales for those products... it's a vital part of the promotional mix in our view."

Ironically, while Kazaa is allegedly used mainly for copyright infringement (Altnet CEO Kevin Burnmeister admits there are only about 5,000 legally rights-managed files available), Sharmar Networks has been ruthless in protecting its trademark and copyright. When K-Lite (a spyware-free version of the Kazaa Media Desktop software) became popular, Kazaa sent cease and desist notices to search engines in an bid to prevent Net users from finding K-Lite. "We have a business to run," Sharmar's Nikki Hemming argued. Sharmar does not receive banner ad revenues when K-Lite software is used to access its network.

While Sharmar doesn't profit directly from the alleged piracy that occurs on its network, it has created

a media empire that would make Rupert Murdoch lime green with envy. Effectively Kazaa has done what every media owner dreams about — it has built a huge worldwide audience of consumers which can be sliced, diced and delivered to advertisers. It sells information collected from its bundled spyware to marketers, along with ad space in the Kazaa Media Desktop, which is precisely targeted at particular groups of users (see "But you agreed to it," page 26). Hemming has no problem with this. "Our advertisers keep us in business and 70-plus million users are telling us they're okay with that relationship."

Speck sees a more sinister side. "Kazaa stores more information about each of its users than any government in the world holds on citizens," he claimed, hinting that the Kazaa trial will be a bonanza of revelations that will stun its users.

ISPs are also accused of profiting from Kazaa. Internode's Simon Hackett told APC that the "gang of

Is the music industry responsible?

Pundits have long argued that if the music industry had been quicker to realise the inevitability of digital distribution, P2P would never have become as big as it has. MIP's Michael Speck says it's not as simple as that: competition rules prevented the major music labels from joining together to offer music downloads.

"Ironically, it is easier to infringe copyright in this country than it is to offer legal music downloads due to competition laws," he says. "If the major labels were to form a download site together, the ACCC would jump all over them for price fixing. They had to wait for someone like Telstra Music to approach each of them individually."

Altnet's Kevin Burnmeister isn't convinced. He thinks the lawsuits in the US and Australia have allowed the music labels to come together and collude in a way that might be considered anti-competitive were it not for the cover-story that they are co-litigants.

"I've been doing [presentations to record labels in the US] for a year," he counters. "And I'll tell you now that every single senior executive that I've spoken to and shown the model to, every one of them has expressed more than interest. In fact, every one of them has said, 'I'm going to give you this artist, I'm going to give you this artist, and I'm going to give you that artist.' They've had no doubts."

"But then it's, 'Wait, I've just got to call my attorney and check.' Right. [The result of] every single f***ing phone call was, 'Are you out of your f***ing mind? We've got a lawsuit against these guys. You're never going to be able to do that.'"

Kazaa: the prosecution

four ISPs (Telstra, Optus, OzEmail and AAPT/Connect) benefit financially when P2P programs are used.

He said that if an Internode customer downloaded a file from a Telstra customer, for example, Internode would have to pay Telstra for that data. But Telstra customers could download all they liked from Internode, and Telstra wouldn't have to pay Internode a cent. Software like Kazaa made large-scale file sharing within a local region so easy for customers it became an enticing business opportunity for unscrupulous ISPs.

With one study showing that just 0.8% of Kazaa's total files represent 80% of downloads, ISPs also stand to gain huge reductions in international traffic bills by caching the most popular allegedly pirate content for Kazaa users.

The developer of Kazaa's peer-to-peer networking technology, Netherlands-based Joltid, calls this technology PeerCache, and MIPI is determined to find out which Australian ISPs are using it.

PSYCHOLOGICAL WARFARE

While Kazaa is under attack from the American music industry's armada of lawyers, the war on Australian turf has become psychological. Six death threats have been levelled at music piracy investigator Michael Speck and ARIA CEO Stephen Peach since action commenced against Sharman Networks.

"The threats were made by phone, and the caller referenced very specific personal details," Speck revealed. "We anticipated [the death threats] — and got them — at certain points in the litigation. The caller leaves no doubt that the threats are directly related to the action against Kazaa." The threats have been referred to police.

No link has been made to anyone associated with Kazaa, BDE or their related companies, nor is any suggested, but MIPI's take-no-prisoners approach has clearly provoked unprecedented fury among Kazaa's users.

Altnet's Kevin Burmeister told

the other side of the story about the raid on his home: "There were five people that I would never under any circumstances let into my home, and it was a complete search of the entire house. They went through my kitchen drawers and my bedroom cupboards... they weren't just taking digital copies of disks; it was a complete invasion of privacy. I was extremely angry about it."

Anger spilled over to allegations of assault during execution of the federal court order at Altnet's parent company, Brilliant Digital Entertainment, in Surry Hills, NSW. A court appointed solicitor from Blake, Dawson, Waldren made a formal complaint of assault at Randwick police station following the BDE raid.

THE UNSTOPPABLE REVOLUTION

Hemming and Burmeister are convinced that P2P distribution is an unstoppable force. Both genuinely believe the music industry will eventually back off its legal offensive because of the efforts Kazaa is making. "Sharman bought the Kazaa software with the express purpose of creating a marketplace for promotion and sale of legitimate, licensed creative work," waxed a press release.

Hemming expertly diverted questioning about unauthorised copyright content away to the topic of how a musician could bundle a video clip and concert tickets with their songs via Kazaa. "The tours and the live events are one of the highest yield incomes for the artist themselves," she told APC. "I imagine that a lot of them are thinking about the creative ways that the intimacy of peer-to-peer can bring them right to the consumer's front-door."

But the company is slippery when it comes to the technicalities of why it can't stop unauthorised distribution of copyrighted works. Each file traded on Kazaa has a unique digital fingerprint in the form of an MD5 hash — a mathematical signature produced by running an algorithm across the contents of a file.

This signature allows Kazaa to

APC: How can copyright be protected and users enjoy peer-to-peer technologies at the same time?

Even before you consider the legitimate online music services, you can see from one look at the pirate peer-to-peer operations that copyright can be protected.

Unfortunately, the P2P pirates only protect copyright when it suits them. It should be no surprise that they are at their best when they are protecting their own copyright and don't hesitate to sue anyone who takes theirs to conduct business without permission.

The legitimate online music services have already proved that they can deliver music just as well as anybody in the digital environment. They have shown that they can negotiate licences for the music so that current tracks are available, pay the owners of the work an appropriate amount, and manage the distribution of the music online [in a way] that is both safe for the artists and the customers.

The legitimate online music services are proving such effective competition against pirate operations that some pirates can't wait to get a piece of the legitimate action. They will tell you their vision is for a time when copyright owners get paid.

It must only be a matter of time before consumers start to act on the obvious unfairness of those building big business from other people's work and turn to the legitimate services for their product.

Despite the obvious contradiction on the P2P pirates' position, they still want you to join their revolution, as if P2P is some magical music utopia. In reality it is — at very best — peer-to-business-to-index-to-business-to-peer (P2B2I2B2P), and all the while the user has to bear any number of electronic tags (cookies). No consumer would go into a store which subjected them to this treatment. That's why most people will tell you outright that they know the P2P pirates are not doing the right thing.

The obvious unfairness of peer-to-peer operations such as Kazaa is the taking of somebody's work without permission, benefitting from it, and never paying for the work. This is not a revolution of a new business model — it has always been described by a single word, "theft." Most people must have wondered how the P2P model can survive, that industry never producing a track or developing an artist.

Let's not mince words, the heartbeat of the success of pirate P2P operators such as Kazaa is the unauthorised trading of millions of MP3 recordings by system users. An operation like Kazaa could not exist financially without its illegal traffic.

Consumers can already enjoy the benefits of the legitimate online music market and it's becoming increasingly difficult for the pirates to avoid explaining themselves honestly.

Michael Speck is general manager of Music Industry Piracy Investigations.



Michael Speck

"This is not a revolution of a new business model — it has always been described as theft"

- identify how many users are sharing the same file so that it can be downloaded from many places at once with complete integrity.

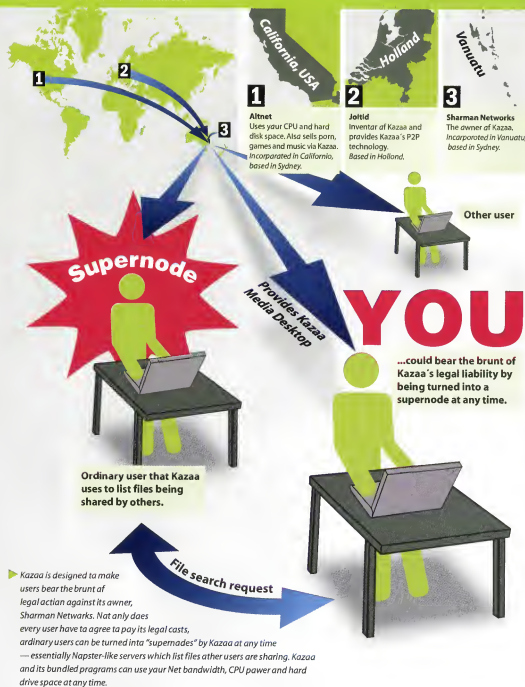
If Kazaa were really trying to become a legitimate service, an obvious first step would be to block the MD5 hashes for known pirated files, argues the music industry.

It's hard to fault that argument, but Kazaa's chief technical officer Phil Morle told APC it wasn't possible. "Using filtering to block copyrighted content in a P2P context is often cited by the record industry as a panacea to the Internet piracy issue," he said. "We have investigated this and have

yet to see any technology that can effectively filter copyrighted files through decentralised P2P.

"In fact, a federal judge in the US found that 'filtering' software for copyrighted files is simply not effective. This is another case of the record industry oversimplifying the technology to suit their argument."

The World of Kazaa



- Kazaa is designed to make users bear the brunt of legal action against its owner, Sharnan Networks. Not only does every user have to agree to pay its legal costs, ordinary users can be turned into "supernodes" by Kazaa at any time — essentially Napster-like servers which list files other users are sharing. Kazaa and its bundled programs can use your Net bandwidth, CPU power and hard drive space at any time.

Despite the legal onslaught against Kazaa, Altnet's Burmeister argued that the bundled Altnet software is playing an important part in giving independent artists a chance to get exposure on a world scale. "We can enable artist Web sites by distributing content for them on Altnet, and they enable their Web sites to be able to sell their content via us without having to set up payment gateways and so on," he said.

But in an American SEC filing, Altnet admitted the future of its business relied entirely on the survival of the Kazaa network. Since Altnet is the only component of Kazaa that distributes digitally rights-managed files, the statement seems to acknowledge the music industry's argument that Kazaa's ongoing success is predicated on its current popularity.

Burmeister said he was continuing to try to get the big five record companies to agree to license their music for distribution via Altnet in the US, with no success.

However, while Burmeister may have been trying hard in the US, that doesn't excuse Kazaa's lack of interest in copyright on Australian turf, according to the industry. The executives of all five major Australian music labels have signed affidavits under penalty of perjury stating that none has ever been approached by Altnet or Kazaa to obtain music licences in the Australian region.

"Apple has to approach every music company in every country individually for its iTunes Music Store," said Speck. "So does everybody else — including Kazaa."

Hemming is convinced Kazaa is being boycotted by the recording industry. "We are not being treated on an even and fair basis in having licences made available to us... There is a universal boycott at the moment by the industry."

A TANGLED WEB

Sharnan Networks is legally based in Vanuatu, but Speck is adamant that it doesn't make any difference. ►

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IT'S A SONY

▶ "The Kazaa system is operated out of Australia," he said, pointing to a locally registered trademark for Kazaa. "Their end-user agreement even says it is governed under the laws of New South Wales. So, everyone from Kazakhstan to Karratha is governed by a NSW-based contract, and yet Sharman still argues it just has an 'ephemeral' presence in Australia."

Speck is confident that the courts won't accept that the distributed nature of Kazaa's P2P system reduces the liability on one central company.

Sharman is working hard to avoid being caught with the digital goods at home: when it was sued in the US, it created a new, almost identically named company in Vanuatu. This raised questions about the exact location of the company's assets and whether the current US case is against a worthless shell company.

Kazaa hasn't been so lucky in the Australian case: both companies are named in the lawsuit and industry sources hint that more defendants will be added when the evidence from the Anton Piller order is eventually released and presented to the court.

The music industry's central argument is that Kazaa's Media Desktop software is deliberately designed to put legal liability back on users. While Napster ran central file servers indexing files being shared by users, proving its legal liability and leading to its ultimate demise, Kazaa turns individual users on its network into file list servers for other users — if a user's PC and Net connection are fast enough, they become a "supernode".

MIPI alleges that this is a concerted effort to operate what it claims to be an illicit enterprise with the legal liability defrayed to users.

THE FUTURE OF P2P

While Kazaa may go down in flames at the hands of the Australian music industry, some analysts believe the music industry is wasting its time. A plethora of other technologies, such as Gnutella and BitTorrent, are far

less vulnerable to legal attack than Kazaa because of more distributed architectures with no involvement by a central company.

P2P will continue to proliferate because of a lack of good legitimate alternatives, said Altnet's Burmeister. "To me, Napster started because it was convenient. People could get everything they wanted in one search box. They didn't have to go to PressPlay for Sony and Universal's music, and MusicNet for Warner and EMI's music."

"The fact that the copyright industries have been unable to arrange their affairs quickly enough to deal with the market and changes that technology has enabled, is the reason why the users in the marketplace have decided to do what they're doing," he added.

Unfortunately for Burmeister, the final victor in the race to establish a market for legal music downloads is unlikely to be Kazaa or Altnet. The music industry has lawyered up and appears to be digging in for the long haul after billions of dollars worth of its content was allegedly stolen via the Kazaa network.

From a music industry perspective, it's also easy to understand why Burmeister's argument doesn't wash. P2P is a hard business-case to make when high-quality, tightly-controlled server-client download services such as BigPond Music are being established in Australia and offer a far more clear-cut revenue stream and rights management capability.

Perhaps P2P will continue to flourish simply because users like downloading free music, software and movies from other users, rather than giving their money to corporate giants like Telstra.

Burmeister's defence relies on a simple philosophy: "I don't need a legitimate excuse for it," he said. "To me it's not about a legitimate excuse, it's about defining a problem and fixing it."

Hemming shares a similar view: "It's the attitude of not waiting for all the lights to go green before starting the journey." **TECH**



Photography by Brendan Read



▶ **Clockwise from top left:** Nikki Hemming being informed about raid developments by investigators; Hemming is asked to wait outside her office while it's searched; lead ARIA lawyer Dr. Kate Harrison leaves Sharman HQ after 12 hours of gathering evidence; Hemming's Porsche Boxster at her Castle Cave home.

But you agreed to it

Kazaa disputes that "value-enhanced applications" bundled with KDM are spyware as the rest of the world knows it. It's all in the 4,208 word Kazaa licence agreement, which also requires you to agree to nearly 20,000 words of associated contracts for GAIN (known previously as Gator), Altnet, Cydoor, Topsearch, Bullguard and PerfectNav.

You agree:

- To run your computer as a supernode on the Kazaa network — a Napster-like list server for people in your area.
- To pay all legal costs and damages for Sharman Networks if something you do on its network results in a lawsuit.
- To never refer to software bundled with Kazaa as Gator (it is there, but you have to call it GAIN when discussing it).
- To allow Altnet to sell your CPU power and hard drive space to other companies that need it.
- To allow GAIN to spy and report on which Web sites you visit, how long you spend at them and whether you order goods online.
- To allow GAIN to rifle through your files and report on what software is installed on your computer.
- Not to remove GAIN from your computer using "unauthorised means" such as spyware removal programs.
- Not to tell any other people how to remove GAIN using unauthorised means.
- To allow your Web surfing to be hijacked by PerfectNav; if you mistype a URL into your browser, PerfectNav diverts it elsewhere.



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Talk is cheap

Increased uptake of broadband and demand for low-cost phone calls have pushed telcos to invest in voice technology. **David Braue** talks up VoIP.

After years as a plaything of über geeks, innovative entrepreneurs and cashed-up, tech-savvy businesses, Voice over IP (VoIP) is entering the mainstream. The technology, which ferries voice conversations across the Internet at practically zero cost, works better than ever and has the potential to save business users thousands of dollars per month.

Considering that some telephone companies tried unsuccessfully to have VoIP declared illegal five years ago, the level of support is remarkable. Net call software Skype is one of the hottest downloads on the Web (see "Online voice apps"), and new providers such as Comindico and Primus are pointing to a big future for VoIP that could even reach ordinary households. VoIP is already part of Microsoft's and Intel's vision for desktop and notebook PCs.

Sceptical? Consider the 100,000-plus customers of Vonage, one of the US's telco upstarts. Vonage believes it'll sign up another 200,000 US customers this year, helping it maintain its status as the biggest player in a market that's expected to grow from 300,000 customers now to more than 5 million by 2006.

So how does VoIP radically alter the way we communicate over the Net? How does it work, and can it really save us cash while transforming the way businesses set up networks?

BEAT THE PHONE COMPANY

There are three types of VoIP services: computer-to-computer, PC-to-PSTN (public switched telephone network, another name for the normal phone network) and phone to

PSTN. In every case, voice calls are digitised and converted to normal Internet Protocol (IP) packets for transmission across the Internet or private IP networks.

If you've never used VoIP, it's easy to try. Indeed, you've already got access to it if you're using Microsoft MSN Messenger, AOL Instant Messenger, ICQ, or Yahoo! Messenger. All of these programs allow you to set up a free VoIP call to another PC with just a few clicks. If you're not using instant messaging, download a program like Skype, Firefly VoIP Soft Phone, MeaPhone.com or PC-Telephone.

One caveat: some users whose computers are located behind firewalls have reported chronic problems getting VoIP to work, since it uses a TCP/IP port that's normally blocked and doesn't respond well to the Network Address Translation (NAT) technique that many ISPs use to support large numbers of users.

The other type of computer-based calling lets you connect with your microphone and speakers (as with PC-to-PC calls), but instead uses a network of Internet-to-PSTN gateways to ferry your call to a local exchange near the person you're calling. The VoIP company pays a few cents per minute termination charge to the local carrier for this privilege, so these services aren't free — you must purchase credits and use the service like a prepaid phone card.

Nonetheless, it's still far cheaper than dialling direct, and you have the added advantage of being able to call almost anywhere in the world. Rates for Net2Phone CommCenter — a major player in the PC-to-PSTN market — are just 3.9 cents per minute to the US; 4.9 cents per minute to the UK, Canada, France, Hong Kong, and New Zealand; 7.9 cents per minute to Singapore; and 47 cents per minute to India. These compare favourably with the cheapest prepaid calling cards available in Australia.

DIGITAL VOICE, LOCAL LOOP

Although it's cool technology, VoIP's past reliance on computers to do its dirty work was a major problem. However, over the next year, Australian telcos will launch a slew of Vonage-like services which bundle a VoIP connection with cable or DSL broadband.

A 1.5MB/s broadband DSL connection has the capacity to carry 150 simultaneous compressed voice calls using technology known as Voice over DSL (VoDSL). VoDSL has been available for the past year or so from

carriers such as Primus Telecom and Request DSL (since bought by PowerTel), although so far it's been targeted at businesses where the telephone bills normally run to thousands of dollars per month.

VoIP services operate at a higher logical level, converting voice signals into data packets that might flow to their destination over the carrier's IP network, a company's intranet or the Internet at large.

Those packets get all the way to the box between your phone and the wall before they're converted into normal analog phone signals. This approach allows any carrier to offer VoIP via your broadband connection without having to replace your existing equipment.

VoIP services are already on the market from Telstra, Optus, Neighborhood Cable and Comindico, which at the time of writing had set the low-water mark with flat rates of 8 cents for an unlimited local call and 6 cents per minute anywhere in Australia. At this stage, Comindico's eCall is a business service targeted at companies with at least five phone lines and a commitment to spend \$250 per month, but expect comparable residential plans after the company launches a wholesale residential service in June.

Because VoIP is so inexpensive for carriers, competition should soon push prices down so far that we'll see flat-rate, all-you-can-talk VoIP services along the lines of the Vonage model. "Ultimately, the pricing regime will change," says Comindico CEO John Stuckey. "The per call service is a thing of the past, and I can't see it lasting." He envisages a future in which consumers will pay a flat fee for a fixed number of calls.

A NEW KIND OF PHONE

If customers switch to VoIP for the low prices, the carriers hope they'll stay for the additional services that VoIP makes possible.

Because calls are handled as data, just like Internet services, it's possible to use VoIP to link your computer and phone in a variety of ways. For example, unified messaging allows you to receive voicemails in your email inbox or have them forwarded to your mobile phone.

VoIP services will let you configure a "hunt group" that forwards incoming calls to alternative numbers — or IP addresses, if

you're using a remote computer or mobile data terminal — until one connects. You can dial numbers with a single click on your Outlook contacts list or a Web directory, and you can easily call in to check your voicemail box over the Internet while travelling using your PC, allowing you to listen to messages at no charge.

Throw in an 802.11b or GPRS wireless connection, and things get even more interesting. Since PDAs, notebooks and new 3G mobile phones are all IP-based, VoIP calls can be easily routed from your landline to you via the wireless service. In this way, you effectively get a completely integrated voice and data terminal wherever you go. With the proliferation of wide-area WiMAX wireless, you'll be able to take your VoIP extension with you too.

MICROSOFT AND INTEL

The appeal of wireless VoIP access is so strong that Intel recently demonstrated a reference chipset design known as Extended Mobile Access (EMA). EMA will build reconfigured VoIP capabilities and phones into notebooks within the next 12 months. EMA includes phone control buttons and a small information screen on the outside of the notebook, and provides an interface that lets users read email and calendar information without

waking the notebook from sleep mode.

Microsoft is also working on its Real Time Communication Server, which will transfer voice calls, email and other data over the Net to office workers' desktop PCs, PDAs and phones. Servers using the Session Initiation Protocol (SIP) will handle complex mixes of voice, data and videoconference feeds.

These types of capabilities will eventually add to VoIP's inherent appeal. "There's a lot of capability that an IP network can provide that would not be economically viable on the type of voice networks we have today," says John Kranenburg, chairman of service provider industry association SPAN, who sees VoIP becoming thoroughly entrenched in the telecommunications world within five to 10 years. "If the commercial offering is right, people will be persuaded to move."

With so much going for it, it seems a certainty that VoIP will redefine the way we think about Net-based communication. Yet

Online voice apps

Kazaa may increasingly look like it's being killed off by entertainment industry lawyers, but have no fear — the Net's next killer application is only just around the corner. With more than 8.5 million downloads, Skype (www.skype.com) is rapidly becoming one of the hottest Net tools after

Kazaa. Created by the same programmers behind Kazaa, Skype works by using peer-to-peer technology to route free, untimed voice calls over the Net. Forget ICQ and other instant text messaging apps — you click on the name of the person you want to talk to and start talking.



▲ Click to talk: Skype offers free untimed calls.

there's still one major obstacle — regulation. Authorities around the world are struggling with the question of how to best define VoIP services for regulatory purposes.

On one side are the VoIP providers, which argue that data services should remain unregulated. On the other are carriers which, even though they're grudgingly embracing VoIP to stay competitive, are startled at the thought of having VoIP scalp customers from a service that comprises more than 60% of revenues and 75% of their profits. In the US, for example, 27 states have already drafted proposed legislation for VoIP regulation in an attempt to hang onto the billions of dollars in telecommunications taxes they currently collect.

Just how the regulatory position spills over into Australia remains to be seen: the Australian Communications Authority has yet to make any definitive rulings on the matter. Once it does, it'll become clear just how much of a cost advantage VoIP can maintain over its predecessors — and just how many benefits customers will ultimately reap from this fantastic technology. **ETB**

ADSL Hell

Switching broadband providers should be a painless experience, right?

Not so, says one victim of a transfer bungle.

Dear Watchdog,
After seeing an advertisement in your magazine, I decided to switch my ADSL service [from OzEmail] to TPG. What a mistake that was!

After the application process was completed I was told that it would be activated within a week. A few days later an email was sent to me saying the "line is invalid or is an inactive service number...ring Telstra". This was interesting since I had ADSL for two years with my previous ISP. I told them this and was sent an auto-reply stating that the "line is invalid or is an inactive service number...ring Telstra".

I then decided to contact Telstra, and spent several hours explaining my problem to almost every department within the telco. The final conclusion was that it was TPG's responsibility. I then spoke to my original contact at TPG and he said the auto-email was generated because my previous ISP

had not cancelled the connection. The application would be resubmitted in the correct manner. Finally, I received notification that the connection was established. I set up the connection as per their instructions and was unable to connect.

In summary, I have no Internet, I cannot make telephone contact with TPG and they are not responding to my emails. Please TPG, either connect my Internet service or refund my money in full.

Anthony Gaudiosi
Wollongong, NSW

It was clear that somewhere along the line there had been some major miscommunication in changing Anthony's ADSL provider. We contacted TPG for an explanation.

Dear Watchdog,
On registration with TPG Internet, Mr Gaudiosi applied for a new installation and not as part of the "churning" or [rapid]



transfer, process. Our third party, Telstra, rejected this new installation due to DSL codes already existing on the nominated service line. These DSL codes belonged to a different provider, not to TPG Internet, and therefore we were unable to proceed in this manner.

As the first method of installation was rejected, we proceeded to resubmit Mr Gaudiosi's request as part of the churn process. By the time a result was able to be established concerning this, Mr Gaudiosi had already cancelled the ADSL service with his previous provider, hence the DSL codes were taken off the line.

Churning is best described as a transfer of services between companies. To transfer from one company to another, two things are required. Firstly, the relevant companies involved both

Warranty woes

Dear Watchdog,

In 2000 I purchased a new UMAX PowerLook III flatbed scanner from a UMAX reseller in Sydney. In 2003 I needed to contact UMAX regarding two issues — the availability of frames to hold different format film when scanning, and the correct version of MagicScan (4.3 or 4.5) to install with Windows XP Professional. The company where I purchased my UMAX scanner was no longer operating. I could find no-one representing UMAX in Sydney, so I went to the Web.

According to www.umax.com.au, the only current distributor of UMAX products in Australia is AIM Digital Imaging in Melbourne. What it doesn't say is that UMAX and AIM Digital Imaging only support products purchased from AIM.

I still haven't received satisfactory answers to my two simple questions from UMAX. Not good enough UMAX!

Frank Cahill
Bondi Junction, NSW

Dear Watchdog,

AIM Digital Imaging (AIM) is supplying support for UMAX products above and beyond the normal Web-based support. However, if the scanner is out of warranty and/or was not purchased through us or one of our distributors (that is, International purchase) we reserve the right to charge for our time as is common practice in such situations. In this case, the scanner was out of warranty, many years old and not purchased via our channel.

[Mr Cahill] was given all the information we had over the phone (Web link and driver versions), he was also sent a CD via overnight delivery at a cost of \$32.80. AIM also answered a call from his service technician (free), and we were surprised to find out that he had not been passed on the necessary information, in particular a link to XP FAQs. UMAX clients can follow the links on www.umax.com.au/order_driver.html for links to current drivers. We list the most helpful pages there.

Steven Brown
CEO, AIM Digital Imaging

Contact us

WE WANT TO KNOW

how IT companies are really treating you. Letters must be under 500 words and include your full contact details and any product information. Write to: watchdog@apcmag.com or PO Box 4088, Sydney NSW 1028. All correspondence becomes the property of APC and is subject to editing.

need to be participants of this process. Secondly, DSL codes are required on the nominated service line for the transfer to be completed.

Due to the DSL codes being taken off the nominated service line, the churn process couldn't be completed. Therefore, we again submitted the request as a new installation.

This second submission of a new installation was rejected due to transmission loss being too high. This means that that there will be a large loss of data for the service, or the premises where the ADSL is required for installation is too far from the exchange. We were informed by [Telstra] that since the customer previously utilised the ADSL service via the same line, we are able to "force" the process. For the difficulties Mr Gaudiosi has experienced, a two-week free extension has been provided on his account.

Louise C
complaints administrator, TPG

There seems to have been a lot of confusion about the correct procedures for transferring from OzEmail to TPG. Should Anthony have cancelled his connection, resulting in removal of DSL codes? Or should he have simply done a "rapid transfer"?

Telstra Wholesale explained to Watchdog that Anthony was right in disconnecting OzEmail before applying for TPG. OzEmail hasn't yet joined Telstra's DSL churn process, so customers can't transfer to another ISP without fully disconnecting first.

Although OzEmail gave a "cancellation number" to Anthony, TPG's application was rejected because Telstra hadn't yet cancelled the OzEmail service. It's hard to say whether this was an OzEmail or Telstra workflow delay.

The second attempt to get Anthony hooked up failed because TPG tried to do a "churn" — even though TPG should have known that OzEmail is not a signatory to the churn process. When we spoke to OzEmail it said it was working to become part of the process.

Optus' speed surprise

Broadband users carefully rationing their downloads at the end of each month might be surprised to learn the Optus "My Data Monitor" isn't entirely accurate. Andrew Young of Burwood in Victoria discovered Optus had dropped his download speed, despite the Data Monitor showing he hadn't yet reached the monthly download limit.

Andrew even sent us two screenshots taken within seconds of each other, one showing him under his download limit, the other saying he had exceeded the limit and his download speed was being reduced.

Armed with the screenshots backing up Andrew's story, we approached Optus for an explanation. An Optus spokesperson responded:

Optus has looked into the issue described by Mr Young and it seems to have been one of

Telstra was to blame for the last problem: obviously, if Anthony had been connected with ADSL previously for two years, his line should not have been later rejected as being incompatible with ADSL.

If you're choosing a broadband ISP, make sure you pick one that supports rapid transfer so that you're free to move to other ISPs with minimal cost and downtime. When we last spoke to Anthony, his ADSL still wasn't connected, and he'd requested a refund from TPG.

DOWN IN THE DUMPS

Last year I noticed a program called EZDialer on my computer. All attempts at removing the application seemed to do nothing and it kept reappearing. Shortly after, I received a bill from Optus for two calls to a place called Sao Tome totalling just over \$91.

Optus eventually offered me a 50% discount on the bill. After talking to their rep, it seemed that their attitude to the bill was simply that it came from my phone therefore I was liable for it.

David Rowland
Stanhope Gardens, NSW

David isn't the only one with mysteriously large phone bills after being online. A quick check finds that more than 730 people reported complaints relating to Internet "dumping" in the three months leading up to Christmas last

My Data Monitor taking longer than normal to update rather than Mr Young being speed limited when he shouldn't have been. It's possible for My Data Monitor to update slowly due to unforeseen technical issues, for example. Hardware failure issues, however, are addressed as a priority. We apologise for any inconvenience to Mr Young.

This was small comfort to Andrew, who claims the monitor still showed him being more than 600MB under the limit more than 20 hours after he was speed capped. "Why should the customer be penalised [speed capped] by Optus when they are acting within the boundaries of the information being provided by Optus?"

Are you an Optus customer affected by problems with My Data Monitor? Let Watchdog know at watchdog@apcmag.com.

year, with disputed call charges ranging from 37 cents to \$3,500.

We spoke to the Telecommunication Industry Ombudsman (TIO); its policy essentially boils down to whether or not the victim was warned about the charges (for example, when clicking on agreements to enter Web sites). Later, David contacted APC to say Optus had demanded full payment of the bill. We asked Optus for a response:

Optus has ceased providing service to certain telephone numbers due to an increase in illegal call activity. We have found that in most cases, usage has been generated from an Internet dialler application. We believe the Optus 1456 override code generated access. The 1456 override code enables customers from any provider to have their calls carried and billed by Optus. In most cases, customers are not required to pay such bills — but Optus deals with each on a case-by-case basis.

In Mr Rowland's case, we would be grateful if APC could give us his details so we resolve the matter with him directly to clear up any confusion at the Optus end.

After reviewing David's case, Optus apologised and agreed to credit the full amount to his account. For more information about whether or not you're liable for Net dumping, go to www.tio.com.au/policies/billing/dumping.htm.

Nibbles

See red

Even though most notebooks ship with an infra-red port, it's relatively uncommon to find one in a desktop PC. Comsol's UIR-120 USB infra-red adaptor (www.comsol.com.au) is a quick and easy way to add wireless functionality to a computer. At \$79, it's perfect for synchronising PDAs, downloading pictures from a digital camera, or backing up mobile phone data.

The UIR-120 supports the IrDA 1.1 and USB 1.1 specifications, so it should be compatible with just about any PC with a USB port. It also supports FIR 4Mbit/s, MIR, SIR, and ASK 56Kbit/s transfer protocols. The dongle ships with a USB extension cable and drivers for Windows 98, Me, 2000 and XP. It also supports Outlook synchronisation.

Burning copper

The use of Gigabit Ethernet via copper is becoming increasingly common in businesses and households. However, the Institute of Electrical and Electronics Engineers (IEEE) has now formally standardised the next step in the evolution of Ethernet.

A 10 Gigabit Ethernet-over-copper standard has been ratified and labelled as 10GBASE-CX4. While this new standard should be around 10 times cheaper to implement than optic fibre-based solutions, it does have some drawbacks. These include a relatively short throw distance in comparison to traditional Ethernet (15m instead of 100m), and the requirement of special copper cable — instead of being based on Cat5/6 twisted pairs, the cable needs to be dual twinaxial cable.

Sadly, this almost certainly means the end of backward compatible Ethernet standards as we know them. However, we're still a few years away from seeing this type of technology in everyday PCs. With an estimated price of \$10,000 per port, current applications are limited to high-speed serial I/O and clustering apps.

Telstra pipped again

As broadband pricing drops rapidly in response to Telstra's \$29.95 broadband deal, it seems like there's no excuse to stick with dialup Internet.

But consumer advocates are warning Internet shoppers to examine terms and conditions carefully: some of the cheap deals aren't what they seem. Telstra BigPond is the worst offender, including only 200MB of usage, and 15c per megabyte thereafter. That translates to \$150 per gigabyte, and Telstra doesn't have a "price cap" policy to protect users from accidentally spending too much.

Competing ISPs have been quick to respond to

Continued under gateway ►

Mega mobile

Better known for its motherboards and graphics cards, Taiwanese manufacturer MSI has dipped into the profitable notebook PC market with the release of two models.

The first is the MEGABook M510C, a 2.9kg Dothan-ready, Centrino-platform notebook featuring a 14- or 15in display. With the option of an ATI Radeon 9600 or 9700 graphics controller, users can take full advantage of the MEGABook's TV-out port.

The second offering, the L6101, is a heftier, desktop replacement-style machine based on the SiS 648FX chipset. It accommodates desktop Pentium 4 CPUs, including the Prescott. Designed to be a multimedia powerhouse, it boasts a wide-aspect 15.4in display driven by a Radeon 9600 GPU, stereo speakers and built-in subwoofer, plus TV and FM radio tuners.

MSI will release notebooks based on both AMD and Intel processors in the near future; expect to see the first wave of reviews in APC June. Visit www.msicomputer.com.au for more details.



Beta beat

Microsoft has finally admitted that it'll miss the projected shipping dates for the next versions of Visual Studio and SQL Server (codenamed Whidbey and Yukon respectively). They were originally slated to hit the shelves late this year, but Microsoft is hesitant to prematurely push any unfinished products to market.

This will impact heavily upon the development of Longhorn applications, as well as the projected release date of Orcas (the version of Visual Studio likely to succeed Whidbey), and the development of a Longhorn-friendly build of Office.

This is hot on the heels of speculation that Microsoft will release a bridging version of Windows (currently referred to as Windows XP Reloaded) in between XP and Longhorn. While Longhorn was initially slated for release in 2005 or early 2006, the anticipated launch date is slipping further and further back to sometime in late 2006 or even 2007.



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visit www.hitachi.com.

▶ Telstra's price reductions, in some cases substantially undercutting the telco giant.

The most eyebrow-raising plan is Exetel's 1GB plan for \$30, with excess gigabytes charged at \$4 compared to Telstra's \$150. However, it's currently only available in NSW.

National ISP TPG has perhaps the best broadband deal ever seen in Australia: \$19.95 for 200MB, but with a maximum monthly spend cap of \$40. Effectively, it's a 256Kbit/s unlimited usage plan for \$40, with discounts for light users.

Prices have also been screwed down across all plans. Internode is leading the charge at the top end of the market, with a 64GB download plan at blistering 1.5Mbit/s speed for \$150 per month. People who don't need that staggeringly large download allowance can get 32GB for \$110 per month or 24GB for \$100.

Check out industry price comparison site Broadband Choice (<http://bc.whirlpool.net.au>) for more detail.

Big audio dynamite

Telstra BigPond has joined forces with Universal for its online music store, BigPond Music (<http://bigpondmusic.com>), bringing the site's total track count to 500,000.

Spokesman Craig Middleton says the site is expected to offer a million tracks by the end of the year. It currently has music from Universal, Sony, Warner, EMI and Festival Mushroom, with a strong representation of Australian artists.

The service bears more than a passing similarity to Apple's iTunes Music Store in the US (no announcement has been made on when the service will launch in Australia). However, BigPond Music only allows downloads in the rights-managed WMA file format, thus excluding Apple's wildly popular iPod music player.

Tracks on BigPond Music cost \$1.89, or \$1.49 for BigPond customers.

Flash for the masses

A fast 90GB flash drive in a 2.5in notebook hard drive form factor? Where can we get one? Israel-based M-System's new drive is higher capacity than the largest mechanical 2.5in hard disk available today, is completely silent and produces a quarter of the heat. It has a burst transfer rate of 100MB/s and a sustained rate of 40MB/s.

But don't reach for your wallet just yet — each drive costs about \$40,000. Australian distributor Soanar Electronics says that while it might be out of the price range of most consumers, lower capacity models like the \$2,000 4GB drive are selling like

hotcakes to embedded computing system integrators who need the reliability that can only be offered by solid-state storage.

The drives are also a sign of things to come in consumer storage: flash media has dropped in price by 30% and is doubling in capacity every year. Manufacturers are already working towards 16GB CompactFlash cards to store 30 minutes of digital video for the new wave of video cameras in development.

Flash-based hard disks are expensive because of the comparatively higher quality memory used. Consumer-priced CF cards can only be overwritten about 20,000 times, while flash-based hard disks have a life cycle of 2 million overwrites before the media becomes physically exhausted. Coupled with a special chip which ensures each block on the disk is written to an even number of times, M-Systems claims lifespans of up to 15 years. For more details, contact Soanar Australia on 1300 889 BB3.

Tasty chips

Many a notebook user has been thwarted when it comes to playing games while on the road. Mobile users typically want lower power consumption video for productivity purposes. But with notebook sales catching up to those of desktop systems, graphical grunt is becoming essential.

ATI's Mobility 9700 graphics chipset offers DirectX 9 support, and boasts a 30% improvement in performance over the previous Mobility 9600 model.

Expect to see the Mobility 9700 featured in notebooks from Acer, Fujitsu, HP, LG, Medion, NEC, Samsung and Targa in the near future, or turn to page 46 for a review of the 9700-equipped Dell Inspiron 9100.

In North America, ATI has also launched the HDTV Wonder. This add-on card (which is also bundled with selected ALL-IN-WONDER products) allows PC users to receive and record NTSC HDTV broadcasts on their computers.

The feature that should set this apart from all other HDTV receivers is the software that's included with the current generation of tuners. ATI has extended its award-winning Multimedia Center software to display, record and burn HDTV content quickly and easily. A PAL version is in the pipeline, but don't expect it to appear in Australia for a little while as it requires some tweaking before it will work here. ATI expect the HDTV Wonder to ship locally in the third quarter of 2004.



▶ Small wonder: water record and burn HDTV

Application station

D recorders are set to boom this year as prices, capabilities and freshness of the technology filters out. Korean conglomerate LG is likely to capitalise on the boom with the first two of a range of set-top D recorders. The DR4812W and DR4922W are slimline units designed to fit in the living room and support multiple DVD recording standards. DVI input allows for the direct connection of video camcorders, and DR4922W also has a 3-in-1 memory card reader for digital still camera media, accommodating SD, Memory Stick and MMC cards. Both models support playback of audio CDs, MP3, WMA, plus MP3-to-CD or JPEG images and feature PAL progressive scan recording. The base model DR4812W is available now for \$999; the \$1,099 DR4922W is due for release at the end of May. Visit www.lge.com.au for more information.



Hand it over

PDAs for \$34.95? Okay, Sharp's "PDA-style" devices can't compete with \$600 handhelds, but if all you're after is a calendar and somewhere to store names and telephone numbers, look no further.

Sharp's no-fuss approach to PDA design is admirable: scrap the extra memory, ditch the fancy features, ditch the multiple screens, and focus on the day-to-day executive essentials.

The ZQP10B base model (\$34.95) has: 128KB of memory; two telephone modes; schedule and memo modes; a 12 column three-line LCD; and two games. Fork out \$159 for the ZQ590 and you get 2MB of memory, an 80 x 111 pixel backlit LCD and synchronisation with Microsoft Outlook. All models feature calculators and a world time function.

Sharp also claims its "compression technology" creates more memory than other organisers. Just don't let your Palm-touting workmates hear for a close inspection; they'll never let you live it down.

Visit www.sharp.net.au for more information.



*nix

MandrakeSoft has just put the finishing touches on version 9.0 of its Linux distro. So far, only MandrakeClub members can download it and provide feedback to the development team. APC leapt on the community version as soon as it was available and discovered that the latest release features version 2.6.9 kernel, XFree86 4.3, GCC 3.3.2, Glibc 2.3.3, KDE 3.2 and Gnome 2.2.2. The standard suite of Linux software is also bundled, including Mozilla 1.6, GIMP 1.2.5 and XMMS 1.2.9. The full version will be available as a free ISO download and in boxed form. Expect a detailed review of APC.

Creative art

Creative Technology has entered the booming digital camera market. The DC-CAM 3200Z delivers a 3.2megapixel resolution with a 10x optical and 4x digital zoom, extremely capable for a \$349 unit.

The 3200Z has 16MB of built-in memory and can be expanded through an SD card slot. It captures still images at resolutions of 2,048 x 1,536, 1,600 x 1,200, 1,024 x 768 or 640 x 480, and up to 30 seconds of MPEG-4 video and audio at 320 x 240. The USB interface allows for easy transfer of files. Creative's PhotoSuite 5 and VideoWave Movie Creator make up the bundle. More information is available at <http://australia.creative.com>.



Stars reborn

Two of Hitachi's latest hard drives demonstrate that the Ultrastar 10K300 features a 300GB capacity and 10,000rpm — minimising its average seek time to 7.5ms. The Ultrastar 5C51 and 2GB/s Fibre Channel support an 89MB/s maximum sustained data transfer rate — a 10% increase when used in RAID5.

Hitachi has also upped the largest capacity hard drive in the Ultrastar 7K400 models spin at 7,200rpm, considering the competition (which typically spin at 5,400rpm).

Parallel- and hot-pluggable serial-ATA form factors are also available. For more information

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was \$699

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\$649



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\$2,199



Power Slimline Server
Microsoft® Windows® 2003 Web Server Edition

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Intel® Pentium® 4 Processor 2.6GHz, Microsoft® Windows® 2003 Web Server Edition, 256MB ECC DDR RAM, 40GB 7200rpm hard disk drive, Integrated IDE Controller, 2x Integrated Intel® Gigabit ethernet controller, 200 watt power supply, 3 year on-site warranty with 24x7 hotline support

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AcerPower F1

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Value Performance Server

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Altos G300

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\$1,799



Veriton 7600G

Intel® Pentium® 4 Processor with HT Technology 3.0GHz, Microsoft® Windows® XP Home, 512MB PC-3200 DDR SDRAM, 80GB 7200rpm hard disk drive, Serial ATA, DVD+CD-RW combo drive, Optical mouse, Integrated AC '97 audio, Integrated 10/100/1000M LAN – Broadband Internet ready, 64MB GeForce4 MX440 AGP 8x graphics card, Acer 17" LCD Monitor, 1-year on-site warranty.
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\$1,999



Large 17" Screen

Aspire 1703SC

Intel® Pentium® 4 Processor 2.6GHz, Microsoft® Windows® XP Home, Large bright 17" active colour screen, 512MB DDR SDRAM, 80GB 5400rpm hard disk drive, 8x DVD + 24x 10x 8x CD-RW combo, Internal floppy disk drive, Internal 56k modem + broadband-ready 10/100/1000 LAN, Full-size keyboard, Stereo speakers with sub-wwoofer

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\$2,499



Power and Scalability Server

Altos G510

Intel® Xeon® Processor 2.4GHz, Dual processor capable, 128MB ECC DDR RAM (expandable to 4GB), 120GB IDE hard disk drive, Integrated 10/100/1000 ethernet controller, 54x CD-ROM, 3 year on-site warranty with 24x7 hotline support
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Virus blame game

We are computer retailers in Northern NSW, and we found your article "Warranty not warranted" (APC March, page 13) to be informative but not necessarily correct. Computer vendors/manufacturers are the principles for the warranty. This is why the warranty is for hardware only.

The vendors assemble the PC bundles with whatever their latest software version is (probably updated every six months). This means the retailer could be six months behind in software updates and the product is still sealed in its box. Not all retailers unpackage the systems, hook them to their own network, perform an online virus scan and do the Microsoft critical updates at least (all updates would be 70MB and five reboots later, or in excess of four hours if on dialup).

We perform all Microsoft updates just prior to pick-up (sometimes delayed because of it), and try to include antivirus software in a similar state. This is extended as a courtesy. We also allow one "free" callback in case we missed something in the end user education about product updates.

After this, we have no control over how quickly or often the end user accesses the Internet. It could be six months later that the customer finally joins an ISP and gets hammered by the next MSBLAST as their antivirus software tries to perform its first update since leaving the shop.

David Taylor
Tamworth, NSW

David raises a valid point — it's impossible for retailers to keep tabs on ongoing virus protection for PC buyers. However, the call to have some virus infections covered by warranty put forward by the Australian Consumers Association doesn't require virus protection to be up to date, just to be present in the first place. It's the PC owner's job to update their own virus protection, but the ACA says the vendor should make sure there's an antivirus product installed, or at least advise the customer of the need for protection. No virus protection? Then it's a free repair. Fair? Let us know what you think at epinions@opcmag.com.

WHERE'S THE NOTEBOOK?

I am curious as to why you have never featured Digital Star's PowerNote notebooks in your reviews. I bought my laptop from them



after seeing it advertised in your magazine. This advertising was one of the factors that influenced me to trust them as a supplier. I note that they have not had any ads with you for a few months.

Brian Hand
Dunsborough, WA

APC journalist David Lin responds:
We reviewed the PowerNote CQ12-15 last year (APC August 2003, page 66) and have a review of the PowerNote CL50 on page 90. We can only review what vendors offer us when we invite them to participate. If they don't submit it only means that they don't think it's an opportune time to offer products for review.

YOU CAN'T LEGISLATE FREEDOM

William Maher's article about government IT purchasing highlighted for me the distasteful side of open source advocacy. Don't think that I don't like open source, because I am a big fan. I use it myself and actively advocate it for use at my clients' sites.

I agree that we have a lock-in situation in government purchasing at the moment, and I also think that this has a flow-on effect into the general business and home user communities. I certainly don't think that the Microsoft Word document format, for example, is an appropriate or even a good format to be calling a standard ("industry" or otherwise). This is especially true for emailing. However, any laws

Letter of the month

I went to Computer World in Richmond, Victoria, to look for a laptop as a present for my wife. After investigating the display quality of the latest and greatest ASUS M6N with its 15.4in wide-screen, we settled on buying the actual laptop we'd been checking out, just so we could be sure there would be no DOA pixels.

Lo and behold, three hours after we got home, after we started updating Windows and Norton AV, we got a permanently lit, red pixel in the middle of the wide, "perfect for multimedia use" LCD screen.

A little side note: ASUS in Taiwan introduced a "zero lit pixel replacement" policy last year. That is, if there was even one constantly lit pixel within seven days of purchase, the laptop would be replaced, no question asked, within 24 hours. However, the Australian representative for ASUS cannot offer the same guarantee.

So far we haven't had any joy with Computer World. Having failed to inform us of the exclusion in their "two-year international warranty", and with the product losing the agreed quality within three hours, you would think it clear enough that they don't have a legal leg to stand on.

After a few letters to them, as well as turning up at their store to negotiate face-to-face, Computer World is still refusing to honour its legal obligation. Our complaint has now been forwarded to ACCC and *Today Tonight's* FairGo Today, so you can all see how useful the Trade Practices Act really is in this case. But like someone said, we wanted the equipment *now*, not six months after the court case.

Geoff Lam
Richmond, Vic

Fortunately Geoff got his replacement, though not before taking his complaint to the ACCC. For his persistence, Geoff wins APC's letter of the month prize, Logitech's Cordless MX Duo valued at \$199.95.



that seek to specifically mandate a particular piece or class of software in procurement are simply replacing one type of lock-in with another, worse one.

The key to all of this is file formats. What we all want is vendor independence and competition. Regardless of what open source zealots preach, I do not believe proprietary software is evil. Everyone is free to choose the business model they want. If we want laws to promote these aims of independence and competition, specifying a piece or class of software is not the way. However, specifying file formats could be.

I put it to APC and its readers that we should call for a law to mandate open file formats for all government software. I'm talking about a formally specified and documented file format that anyone should be able to implement. Then we have no vendor lock-in and software providers can compete on a level playing field.

Why should we demand that proprietary vendors cough up their file formats? In private business we would have no right to ask. If you don't like closed file formats, don't buy software that uses them. When public money is spent, I believe we should own the information produced. That means being able to properly access it long after the original program is superseded, or the vendor is replaced.

If we were to get a law like this, the door would be open to all comers to offer up software suitable for government use. We don't want to change from effectively forcing everyone to use Microsoft to forcing them to use something else. I hope it's obvious to everyone that this would be far worse.

Michael Bryce
Mareeba, Qld

LINUX LEAVES BAD TASTE

I get the feeling you guys are losing the plot, and on the way you're losing me. There may well be millions out there obsessed with Linux (APC March, page 16 and many other recent articles), but equally there are billions more who are familiar with and reasonably satisfied with Microsoft products.

It's fine to see balanced articles and a balanced content pointing out the open source alternatives and their development. It's also fair to say that for a relatively small bunch of people out there, open source is a crusade and APC should let us know people feel this way. But

that should be as far as it goes. Most of us in the real world don't hate Microsoft and we're not going to, no matter how politically incorrect that may be to some people. We just want to use the products, and those of the competition, be told about how to use them better, and get on with our lives.

It appears from recent articles that APC risks losing this sense of balance.

Jerry Perkins
North Sydney, NSW

While the Linux crowd are passionate and idealistic, we fully appreciate that other computer users can find it hard to care. It's just a piece of software, right? If it gets the job done, then it's served its purpose. That said, covering alternative technologies such as Linux is something APC has always received positive feedback about from our readers. What do other readers think? Should there be room for an alternative to Windows on the desktop? Send your thoughts in less than 500 words to epinions@apcmag.com.

SITTING DUCKS?

I work as an IT consultant and am a little worried about the current ADSL explosion hitting the market, particularly for domestic users. Any ISP offering free USB modems with their plans surely cannot be operating in the best interests of their clients? I have friends who signed themselves up on such a deal and got a free modem with the package. A quick port scan later, I found that their telnet port was open by default on the modem, and after a few guesses at default passwords I could gain access—and I have no hacking skills whatsoever!

Surely ISPs have a duty of care to their customers to at least acknowledge on their advertisements that additional hardware is necessary for protection. At the moment, it's like giving someone a car without locks.

Nik Devidas
Melbourne, Vic

SUPERMARKET PC CUTS CORNERS

I have found a few irksome things about the set up of the Medion machines from Aldi (APC February, page 38). For a start, the space is so compact that in order to install an extra hard drive, the cables have to be relocated and the second RAM stick has to be removed to allow the HDD to be negotiated into place. This is not easy with ham-size fists.

Agenda: Your place to vent

This ongoing issue with Domain Names Australia (DNA) has now gone beyond a joke. I have four or five clients who have received letters from DNA requesting payment for additional domain names they didn't want to register, and each time they have rung me to say, "I thought we had paid this."

The first time, I had the client fax DNA's letter through to me. That is when I realised what the company was doing — attempting to charge for registering the equivalent .com domain name, over and above the .com.au domain name they had registered. I explained this to my clients and told them to throw the letter in the bin, pointing out that \$237 is a massive overcharge for this in any case.

Further, I have one client who has received this letter no less than three times, and each time become confused.

Scott Davey
Seacliff Park, SA

At the time of writing, both the ACCC and the Australian Internet authority, AUDA, had requested an injunction to prevent Domain Names Australia from undertaking practices such as these. APC will keep you posted on the legal outcome of this issue, which has frustrated many of our readers.

Also, what I miss most are the indicators on the front panel. When I was doing the initial setup of the machine to meet my requirements, the system hung a few times. The only way I could tell that nothing was happening was to use the old Ctrl+Alt+Delete combination to get the Windows Task Manager to tell me what was (not) happening. The machine had to be turned off to be reset. Hopefully, Medion can fix this problem in the future.

Gary Bywater
Queenbeyan, NSW

FREE CDS

I have just read your snippet "Big Blue's Backup Blunder" (APC March, page 31) and would like to point out that what Kingsley Burlinson said was not totally correct. As he stated, if he'd wanted a recovery CD, he would have had to pay \$82.50 for a set. While true, what he did not say was that if he'd contacted IBM within 30 days of receiving the ThinkPad/ThinkCenter, IBM would have provided a free set of CDs.

This method makes sense to companies that do rollouts of hundreds of identical machines. Rather than sending out hundreds of identical sets of recovery CDs, vendors only ship them on request.

Personally, I believe other companies such as HP, Dell, and so on should do the same thing where possible — when you order a mouse, keyboard and monitor from HP, for example. Since those three are all individual products, they arrive in separate packaging. However, they also ship with separate CDs.

Pumynt Chooboonroj
Hoppers Crossing, Vic

PIXEL SURPRISE

I've just bought a new Dell computer with a flat panel 17in LCD monitor. I was surprised to learn of dead pixel problems experienced by LG patrons (APC March, page 30). Are Dell monitors better than those of LG in quality? And most importantly, does my LCD panel have a "no dead pixel warranty"?

Aaron Ong
Dar Es Salaam, Brunei

Our recent roundup of LCD screens didn't include Dell because it doesn't sell any standalone 17in desktop screens. In any case, Dell's warranty policies in Australia are different to those in other countries. So we can't really say if Mr Ong is covered or not without getting more info. What we can say is that he'll be covered by the warranty of the country where he purchased the system, and will have to be in that country in order to have that warranty acted upon.

PC PROCRASTINATION

Does a home user require a dozen layers of security when a simple antivirus such as AVG (www.grisoft.com/us/us_dwnl_free.php) and built-in XP firewall would suffice with less strain on system resources? Would the hours consumed in overhauling hardware and

software to save several seconds of loading time have been better spent grinding down to real business? Today's PCs are fast enough to handle anything work-related without deviating from default settings. Did making Windows look pretty with bells, whistles, cheap thrills and frills accomplish any real improvement in terms of productivity?

The bottom line is that the computing knowledge we accrue creates a convincing illusion of the computer being used effectively. It's an illusion concealing the fact that the PC has consequently devolved into a toy — the object of obsession and paranoia.

Chung Ooi Ton
Wantirna, Vic

HELP TELSTRA!

Connecting to the Internet within rural Australia is supposed to be easy these days, but to my dismay Telstra has made it even more difficult.

My parents live about 7km south-east of the small township of Nanango in Queensland. Problems with their dialup connection started with dropouts and poor line speeds that vary widely (from 19.2KB/s to 31.6KB/s, with 26.4KB/s currently the average), due to pair gaining of telephone lines. What's more, interference renders the lines useless even for voice at times.

This issue has been an ongoing problem for the last two years and Telstra basically doesn't want to do anything. If Telstra had the same quality of lines in the country as it does in the city for basic dialup, it wouldn't be such an issue, but apparently politicians think connecting at 19.2KB/s is totally acceptable.

We would like to consider new technologies, but the cost of ISDN and satellite are prohibitive — my parents are both pensioners — and Telstra says we can't get ADSL.

I personally think that Telstra is more interested in making profits for its shareholders than providing a basic service that people in the city take for granted.

J. Byleveld
Brisbane, Qld

MX MADNESS

I am an experienced Webmaster and one of my most frequently used tools is the Macromedia MX suite. Still, it's a great product and I fully recommend it.

Last year, however, I made the mistake of going to a Macromedia seminar where the CEO

Prize Pit

The lucky winners of our March Ulead DVD Workshop 2 giveaway are: H.Wong of Glen Waverley, Vic; S.Washington of Glen Iris, Vic; L.Howes of Campbelltown, NSW; and P.Pritchard of Andergrove, Qld.



of Macromedia Australia sold me on the very sensible concept that every copy of MX2004 has a legal double licence: "One for home, one for work." That's where the good news stops.

MX2004 should be avoided at all costs. Maybe it does one or two things that MX doesn't — if so, I have yet to find them. But it doesn't do half the things that MX did.

Mostly it's little things, like Dreamweaver's annoying red boxes around text that make it difficult to select text. And the positioning of the link box so that, at 800 pixels, you can't see the anchor point when the menu is open. And the badly laid out menu, with simple commands about four clicks away. (Yes, I know there are shortcuts. That's not the point.) Not to mention the utterly unfathomable and profoundly stupid decision to abandon Normal View in Flash's actionscript panel.

This may not mean much to fluent actionscript programmers, but to everyone else it renders Flash utterly useless. They might as well have kept the disc and sent me the empty box for all the good it does me.

MX2004 has disappeared from my PC desktop, and with it a great deal of the goodwill I had for Macromedia products.

Patrick Boyd
Mount Hawthorn, WA

Error Log

The HP Photosmart 245 featured on page 56 of APC's April issue was incorrectly priced at \$438.90. It should have been \$399.

Have your say

Add to these discussion threads or mail your views (in less than 500 words) to epinions@apcmag.com.

All correspondence becomes the property of APC and is subject to editing. Letters sent to epinions@apcmag.com must include the writer's full name, suburb, state and phone number to be considered for print publication and in the running for letter of the month prizes. Phone details will not be published.

Hip.



Joybee 150 Noble Silver, Passionate Orange & BenQ Purple



Joybee 120 Cool Silver, Passionate Orange & Radiant Green

Joybee

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Osbourne Park, WA 6017
Tel: (08) 9244 3666



On Test

Detailed product reviews and comparisons

40 FileMaker Pro 7

The desktop database heir apparent edges just that bit closer to becoming undisputed king.

42 AMD Athlon FX-53

The second release of AMD's Athlon FX platform is even better than the first. If only Microsoft could finish an OS to go with it.

44 ELSA video cards

ELSA's mid-range graphics card line-up delivers respectable performance at an affordable price.

46 Dell Inspiron 9100

The Inspiron 9100 takes the desknote to a new level, packing an impressive set of desktop PC components into a 4kg frame.

48 WinZip 9.0

WinZip 9.0 offers many features above and beyond the standard ZIP support found in Windows XP.

48 Macromedia Director MX 2004

Interactivity is the name of the game with the latest version of this popular Web authoring tool.

50 S-Media CoCoPod

S-Media brings a solid offering to the competitive portable MP3 player market.

50 Apple iPod mini

It's small and stylish, but how does the tiniest iPod measure up against its bigger brothers?

52 Forward Solutions Migo

The Migo is a handy way to take desktop, personal files and mail to virtually any Windows PC.

52 ASUS Pocket Wireless Access Point WL-330

Slightly smaller than a deck of cards, the WL-330 is an example of true innovation.

54 PhotoVista Panorama 3

This stitching application from iseemedia is a must-have for photography buffs, architects and artists.

54 2Entwine Gush

If you're after an all-in-one, Jabber-based communications medium, Gush may be just the ticket.



Labs Challenges

Wide-screen DLP and LCD projectors

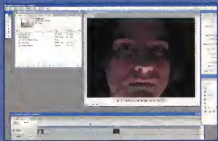
With LCD and DLP projectors dropping in price, home theatre enthusiasts are looking to wide-screen units to complete their setup. *Troy Michlmayr* examines four of the top contenders.

58

802.11g wireless access points

Wireless networking is booming in home and office environments. *Nick Race* puts 10 wireless access points on the hot spot.

70

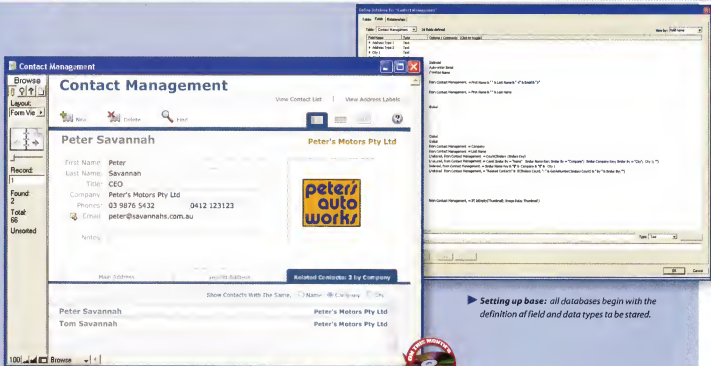


DVD authoring software

Serdar Yegulalp shows there's a DVD authoring package for just about every budget.

62





► **Setting up base:** all databases begin with the definition of field and data types to be stored.

► **Manage related contacts:** customise the enclosed template to relate contacts by company.

FileMaker Pro 7

Despite some flaws, the desktop database heir apparent edges closer to becoming undisputed king.

Heralded by its legions of users ever since its earliest days as the only desktop database worthy of consideration, FileMaker's ease of use has been its advantage over Microsoft's equally capable Access.

The main difference between the two programs was that just about anyone could find a use for FileMaker, quickly adapt it to their needs, and then bolt on increasing sophistication as their familiarity grew. That hasn't changed.

FileMaker 7 aims to extend its usefulness beyond the database itself by relating data with external files, as well as enabling their launch from within its shell. To this end it boasts a whole new architecture, along with the ability to "manage almost any file" by storing links to most external file types, including Word, Excel and PowerPoint, plus Adobe Acrobat PDF files, MP3s and so on.

FileMaker's ability to interact with Excel spreadsheets has ensured its widespread acceptance among Windows users, making the program an indispensable tool for those wishing to apply sophisticated searching and database-scripting capabilities to such data. It's also long been able to publish directly to the Web and intranet, transcending the limitations of access via desktop alone.

With relational capabilities and capacity for communication via tools such as ODBC, established way back in version 3, it's capable

of sharing data with the likes of SQL and Oracle. That said, FileMaker never was, and never will be, the tool giant corporations revolve around. Rather, it's an increasingly able application which can easily handle the data-management demands of smaller organisations and workgroups.

FileMaker 7 is available in Windows, Mac OS X Developer, Mobile (Palm and Pocket PC) and Server versions. A Linux server version should also be available by the end of 2004.

TWO STEPS FORWARD

In the tradition of "creative appropriation", the database table-control and relationship-mapping features of Access have spawned FileMaker 7's most compelling advances.

A limitation of previous versions of FileMaker, in comparison with Access, has been that each database "table" was a single file. Relationships between tables were often broken by misplacing a related file in a different directory. The single file-table structure also posed limitations in the flow of data between related records.

In version 7's streamlined relational architecture, however, all related tables, are contained within the same file. As a consequence, all controls relating fields in one table and can now be accessed through the single interface.

One of FileMaker's greatest strengths has been its ability to display related data — all contacts within a given company, for instance — on the same screen. This allows the user to jump between those related records and to establish different views of the data, according to need. Further enhancement has been provided by the program's capacity for extensive graphical manipulation and the ease with which the user can script reports to automate the updating and display of records.

However, the structural file redesign means that "multi-factorial"

relationships — those matching data on more than one criterion — can now be established neatly, efficiently, and with ready two-way data-flow. For example, at the most basic level in older versions it may have been possible only to create matches to find all contacts within a city. Further narrowing these down — to find all contacts in a city named Harry — required a new and separate operation. But with the new version, it's a simple matter to make a match on multiple criteria. Further, where previously relationships created only a one-way flow of data, the flow is now equally smooth in either direction.

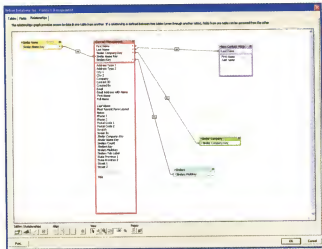
Similarly, the simplicity of scripting and running new calculations between fields on different tables is vastly enhanced by the capabilities for management within the same console in the new file structure. For instance, cute new quirks within FileMaker Pro 7's calculation capabilities allow for changes of text colour when the content of a field meets (or fails to meet) a given set of conditions.

ONE STEP BACK

At first glance, the potentially magical advance of being able to connect all critical information in one place by managing and relating data contained in third-party files should have new users beating down the doors. Instead, this is where our disillusionment begins.

FileMaker 6 made it possible to import of a folder of picture files — or links to them — into a database file in a single action. So it's tempting to expect that it can execute such batch imports with other file types, or external files relating to a given project. However, this is only possible by importing a container-field link, one file at a time. It's an advance over previous capabilities, and great for creating data-relationships with files of future work, but what about when you need to import a body of legacy files attached to older projects?

Given the fact that you can import older files with version 7's multi-table features, it follows that the user should be able to open a group of related files and absorb them into a new, combined file.



► **Making new relationships:** FileMaker's graphical relationship-management interface relates records with a single click.

It's in the script

A database is not a dead repository of data, but an evolving entity built to facilitate a range of potentials.

FileMaker's ability to enable users to create fast, effective routines for getting different perspectives on their data is one of its greatest strengths. Version 7's structural overhaul puts even more lead in its pencil.

In this land of rich promise lies scripting — the creation of fast routines tailored by the user to pull information out, manipulate, and display it in a preferred format.

Through the Scripts menu, FileMaker enables the creation of such customised routines by grabbing their elements from an extensive menu of pre-programmed blocks of code, each of which performs a discrete function.

There's no programming involved: simply grab the bits you want, string them together in order, and bingo, you've built yourself a script.

Since scripting facilitates conditional statements — "ifs", "thens" and looping operations which repeat instructions in a group of records — it's also the most economical way of obtaining results from a database.

Complex calculation fields could carry out many operations for which you might build scripts. However, the more complex the calculation and the more of them in process at any given time (in FileMaker's new structure, this includes those running to 400 decimal places), the greater the hit on your database's performance. Building in too much complexity early on may also limit flexibility later.

Scripts can be as simple or as complex as you wish. For most users, however, the only limitation lies in their imagination.

This would mean that the user could re-establish the previous relationships within the new file structure. Unfortunately this functionality doesn't exist. Nor does the capability for duplicating an existing table within a version 7 file, as you can with a record, script, layout, relationship, or value list.

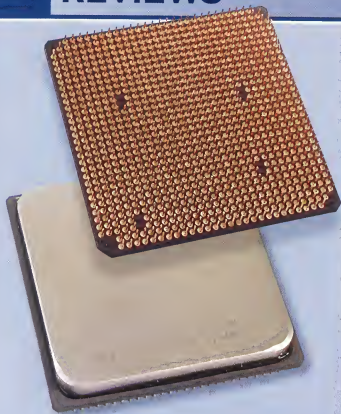
But it's in the layout mode where our biggest grievance and suggested deterrent to immediate uptake lies. Never previously a problem, version 7's graphical layout interface is so resistant to movement of objects that we were surprised the product was released at all.

Gripes notwithstanding, there is more than enough new functionality here to satisfy most users, whether for desktop applications or publishing to the Web or intranet. The capability and cost-effectiveness of this solution are not in question. However, our advice is to hold off until (the no doubt forthcoming) version 7.01 is released and the significant flaws in layout mode are fixed. Then you can get on and do some real work.

Graham Lauren

Details

Contact	FileMaker
Phone	1800 028 316
Online	www.filemaker.com.au
Price	\$499
✓	Elegant file structure and interface.
✗	Lack of flexibility for the update of existing files.
Verdict	●●●○



► **Lone star:** the Athlon FX-53 is a top performer, but it lacks software support.

AMD Athlon FX-53

The second release of AMD's Athlon FX platform is even better than the first. If only Microsoft could finish an OS to go with it.

AMD has finally rolled out the next processor in its premium line of x86-64 CPUs. The Athlon 64 FX-53 is clocked at 2.4GHz, up slightly from the 2.2GHz frequency employed by the FX-51. Both processors provide onboard dual-channel DDR 400 memory controllers and require registered DIMMs to attain maximum performance.

Even though AMD's Socket 939 boards and chips appeared in April to replace the current Socket 940 line, the company will release both 939-pin and 940-pin packages for at least the FX-53 and upcoming FX-55. The biggest benefits of moving to Socket 939 are the inclusions of a 1,000MHz HyperTransport bus and dual-channel memory controller not tied into using registered memory. Socket 939 will eventually become the only socket for both the Athlon 64 FX and Athlon 64 product lines.

The demand for ECC-registered DDR RAM modules is a hangover from Athlon 64 FX's roots in Opteron architecture, but they're more costly than regular DDR SDRAM modules. This dual-channel memory controller was the reason the Athlon 64 FX-51 was released in Socket 940 packaging: it provided the performance boost over the Socket 754 Athlon 64 needed for gaming rigs and high-end workstations.

The current 754-pin Athlon 64 CPUs feature 1MB of Level 2 cache, which will drop to 512KB under the new architecture, though AMD has

Benchmarks

	Windows XP SP1 (32-bit)	Windows XP for 64-bit Extended Systems
SPC CPU2000 SPECint Integer Test		
AMD Athlon 64 FX-51	1,326	1,428
AMD Athlon 64 FX-53	1,412	1,516
SPC CPU2000 SPECfp Floating Point Test		
AMD Athlon 64 FX-51	1,255	1,344
AMD Athlon 64 FX-53	1,365	1,598

plans to keep pushing the 1MB-equipped 754-pin units until later this year. While the drop in Level 2 cache will reduce performance, the loss will be negligible thanks to the inclusion of a dual-channel memory controller on Socket 939 boards. The FX processors will keep their 1MB of Level 2 cache.

The FX-53 looks to be the final swansong for AMD's 130nm process — the company plans to debut new 90nm silicon-on-insulator facilities later this year in order to launch the FX-55 at 2.6GHz. The Athlon 64 4000+ is slated for release around the same time with a 512KB cache.

SLOW UPTAKE

Adoption of Athlon units hasn't been as swift as the Opteron, mainly due to the fact that Microsoft hasn't been able to release the final versions of Windows XP or 2003 Server for 64-bit Extended Systems. While Linux appeals in the server space, it has yet to make a massive impact on the desktop — especially for power users. While buyers are free to install 32-bit versions of Windows XP or 2003 Server on Athlon 64 or FX-based systems, the performance boost is minimal.

Microsoft announced late in 2003 that the AMD-compatible 64-bit version of Windows would ship in first quarter 2004, but PC enthusiasts have come to regard such claims with a grain of salt. At time of writing, Microsoft still couldn't supply a final or near-final version of a 64-bit native OS for AMD systems, either through its MSDN network or directly. The FX-53 was benchmarked under beta versions of both Windows XP and Windows 2003 Server for 64-bit Extended Systems.

Not all tests managed to run successfully. The ones that did showed a slight performance enhancement for 32-bit apps over the FX-51 and a jump in floating-point performance — traditionally the Athlon 64 platform's strength. SPEC CPU2000 managed a score of 1,412 in SPECint (its integer test), up from 1,326 recorded on the 2.2GHz Athlon 64 FX-51 system, while SPECfp (a floating-point test) leapt from 1,255 to 1,365.

There's a slight lag in 32-bit mode as the 64-bit architecture requires 32-bit memory addresses to be converted to 64-bit to work.

The FX-53 is destined for high-end desktop workstations and serious gaming machines, but may take some time to filter down to the mainstream — the release of 64-bit software will help drive adoption.

There's no question the architecture is solid and reliable. Rather, it's a question of waiting for all the pieces to fit together to build a top-performing desktop machine that can actually be used to do some serious work.

Matthew Overington

Details

Contact	AMD
Phone	(02) 8877 7222
Online	www.amd.com.sg/au
Price	US\$733 each in orders of 1,000
✓	Great performance.
✗	Still no dedicated version of Windows.
Verdict	●●●●○



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► **Play hard:** (from top) the GLADIAC FX 935XT, FALCOX 960XT DVI and the FALCOX 960XT VIVO.

ELSA GLADIAC FX 935XT, FALCOX 960XT DVI, FALCOX 960XT VIVO

ELSA's mid-range graphics card line-up delivers respectable performance at an affordable price.

Ever since the Radeon 9700 beat Nvidia to the punch as the first DirectX 9-optimised chipset in retail channels, ATI has solidified its position as king of the video card industry. Not everyone has the budget to spend upwards of \$800 on a video card though, so it's fortunate that there are plenty of graphics cards available for under \$350 that provide more than reasonable frame rates in even the most taxing applications. And these three cards from ELSA fall directly into this category.

It's unusual for a video card manufacturer to cater to both sides of the Nvidia/ATI fence, but that's exactly what ELSA has done. Its range includes the ATI Radeon 9600 XT-based FALCOX 960XT DVI and FALCOX 960XT VIVO cards, and the Nvidia GeForce FX 5900-based GLADIAC FX 935XT.

The only difference between the two FALCOX cards is the 9600XT VIVO's video-in/out functionality. Both cards run at a core/memory clock speed of 500/600MHz, and include an ample 128MB of 2.8ns DDR BGA memory. They also have all of the features built into the Radeon 9600 XT core, such as dual-monitor support (aided by the bundled DVI-to-VGA adaptor) and OverDrive (ATI's software-driven overclocking tool).

The FALCOX cards are bundled with full versions of 3DMark2001 Pro, Rainbow Six 3: Raven Shield, Tomb Raider: The Angel of Darkness and InterVideo WinDVD Creator.

The GLADIAC FX 935XT boasts a slightly lower core clock of 390MHz, yet includes 128MB of DDR memory running at 700MHz. The FX935's software bundle only includes a full version of Delta Force: Black Hawk Down.

START YOUR ENGINES

Each card was tested on a 3.2GHz (800MHz FSB) Pentium 4 processor with an Abit IS7 (i865PE) motherboard and dual sticks of 512MB OCZ DDR500 memory. ATI tests were run using the Catalyst 4.2 revision; Nvidia tests were performed with the 53.03 ForceWare drivers.

As expected, the Nvidia GeForce FX 5900 chipset marginally outperforms the ATI Radeon 9600 XT in all benchmarks, with the most significant gains seen in the DirectX 9 benchmarks (Halo and 3DMark2003).

Apart from frame-rate tests, image quality analysis is one of the most important considerations when making a video card purchase. In regular situations with full-scene anti-aliasing (FSAA) and anisotropic filtering (AF) disabled, it's impossible to objectively pick out any significant differences in image quality between the Radeon 9600 XT and the GeForce FX 5900. Both produce superb and crisp images. However, a clear winner starts to emerge with FSAA and AF enabled. With FSAA enabled, the 9600 XT chipset takes less of a performance hit and produces a noticeably superior image. The 5900's image quality is by no means poor, but it's no match for ATI's offering in this regard. There is no discernible difference between the cards as far as AF is concerned.

Overclocking tests were conducted with the popular PowerStrip utility. In an enclosed case with stock cooling, both Radeon cards hit 590/620MHz core/memory, while the GeForce 5900 reaches 425/750MHz. Although both are respectable scores, don't expect any noticeable performance increases in current games.

While frame-rate junkies will appreciate the excellent performance offered by the GLADIAC FX 935XT, the FALCOX 960XT cards boast a superior software bundle, are cheaper and one includes video-in/out support. Overall, the fact that each of ELSA's cards offers its own set of advantages and shortcomings makes it difficult to determine a clear winner.

Asher Moses

Details

Contact Altech
Phone (02) 9735 5655
Online www.altech.com.au

ELSA GLADIAC FX 935XT

Price \$350

✓ Excellent performance.

✗ Expensive; poor software bundle; lacks VIVO support.

Verdict ●●●●○

ELSA FALCOX 960XT DVI

Price \$295

✓ Superior software bundle; affordable.

✗ Lacks VIVO support; slower than the FX935.

Verdict ●●●●○

ELSA FALCOX 960XT VIVO

Price \$330

✓ VIVO support; great software bundle; inexpensive.

✗ Slower than the FX935.

Verdict ●●●●○



survival of the fittest

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Dell Inspiron 9100

Dell's Inspiron 9100 takes the desknote to a new level, packing an impressive set of desktop PC components into its chunky 4kg frame.

The desknote phenomenon has turned the notebook market on its ear. The computing industry has spent years trying to fit an increasing amount of PC into an ever-shrinking enclosure, but the driving force behind desknotes is the search for portable power.

If this is the only yardstick by which to judge desknotes, Dell's Inspiron 9100 looks like a winner. Our review unit shipped with specs that put most desktop machines to shame, including a 3.2GHz Hyper-Threaded Pentium 4 processor, 2GB of DDR SDRAM, and a Mobility Radeon 9700 GPU. It runs on a desktop chipset and, in fact, the 60GB notebook hard disk and slimline DVD+RW drive are the only concessions made to mobile kit.

The entry-level model features a 3GHz Hyper-Threaded processor, 256MB of RAM and a 30GB hard disk. Our review unit's 15.4in screen runs at a native resolution of 1,900 x 1,200 pixels, but lower resolution panels are available at a reduced cost.

This is not a notebook for people on the road. The unit tips the scales at around 4kg, so it's not something that can be easily carried all day. However, this is largely a moot point as very few laptop bags will fit a notebook measuring 37 x 28 x 6cm. The base of the machine features a number of large vents, so while it remains relatively cool during operation, running it on your lap isn't advisable.

Benchmarks

Business Winstone 2002

0 33.6 50

3DMark2001

0 11,465 20,000

MCC Winstone 2004

0 29.5 50

► **Numbers don't lie:** The Inspiron 9100 rivals the performance of many desktop machines.

The machine is cooled by three large internal fans but remains exceptionally quiet during operation — even under the load of solid network gaming. There is the concern that one of these fans could fail during operation, thankfully Dell are currently working on a software agent to warn users of any overheating issues.

IMPRESSIVE FIGURES

The 9100 scores 29.5 under Multimedia Content Creation Winstone 2004 and 33.6 under Business Winstone 2002, putting it towards the top of the class on raw number-crunching performance. While it runs at a rapid clip for office tasks, the unit comes into its own under video testing. The score of 11,465 in 3DMark2001 puts the 9100 at the head of the pack for portables in 3D benchmarks. This impressive score is largely due to the Mobility Radeon 9700 chip and 128MB of dedicated video memory. Dell has also included a DVI output on the rear of the machine to complement the standard S-Video and VGA connectors.

There was a concern that the combination of the Hyper-Threaded Pentium 4 processor, massive screen and power-hungry video card would force us to record the battery time in seconds rather than minutes or hours. However, the massive 16-cell battery in our review model helps the unit achieve just over two hours during MobileMark 2002 testing, so expect the 12-cell unit to last around 90 minutes.

The notebook manufacturer has also taken a slightly unusual approach to sound: the Inspiron 9100 can be fitted with a subwoofer, but doing so means the 16-cell battery won't fit in the machine and users will have to rely on a 12-cell unit instead.

PORTS APLENTY

Standard USB ports provide around 0.5amps of current, which is insufficient to drive an external CD burner motor and laser assembly. Dell has designed a USB port that delivers a higher current to allow users to do away with additional power supplies for devices like CD or DVD burners. Unfortunately, this port uses proprietary technology, so a Dell-branded external drive will only work with compatible laptops. Manufacturers such as BenQ are choosing to spec notebooks with a single, 1.5amp USB port to get around this issue while maintaining compatibility with industry standards.

The Inspiron 9100 includes three standard USB ports, along with a powered USB slot for running an external CD burner.

Though technically a notebook, the Inspiron 9100 is more like a compact desktop. It combines blazingly fast benchmark scores with plenty of flexibility — just make sure you don't have to carry it far between desks.

Matthew Overington

Details

Contact	Dell
Phone	1300 303 260
Online	www.dell.com.au
Price	\$3,999
✓	Powerful; impressive performance.
✗	Massive power brick; bulky unit.
Verdict	●●●●○



perfection runs with the best

The ASUS L5 notebook represents the flagship of the ASUS range and there are perfect reasons why it is the best. Put simply, if you want it you got it.

The ASUS L5 has the most advanced features from the massive 15" screen, ATI's MOBILITY[®] RADEON[™] 9600 graphics engine or the high speed Intel[®] Pentium[®] 4 2.8Ghz processor.



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ACT

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Healin Computers 08 9201 2788
Computer Cybershop 08 9227 6590
PLE Computers 01 9309 4771

VIC

Centrecom 03 9630 0988

Details

Contact	WinZip
Online	www.winzip.com
Price	US\$29
✓	Secure encryption; unrestricted ZIP file sizes; intuitive interface.
✗	Basic ZIP features included in Windows XP.
Verdict	●●●●○



Name	Type	Modified	Size	Ratio	Unpacked	Path
Public tools file.pdf	Adobe Acro...	05/02/2004 14:05 PM	236,412	34%	184,791	
For Win Windows Security.pdf	Adobe Acro...	05/02/2004 12:17 PM	388,276	92%	357,146	
ECI WebTech executive summary.pdf	Adobe Acro...	05/02/2004 02:33 AM	185,064	6%	170,686	
Intel FC 1000 Management.pdf	Adobe Acro...	05/02/2004 01:12 AM	611,728	49%	302,379	
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Microsoft Exchange 2003.doc	Microsoft W...	04/02/2004 16:20 AM	115,200	72%	73,760	
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Microsoft software brochure.pdf	Adobe Acro...	05/02/2004 12:18 PM	22,461	27%	16,462	
For inter face.pdf	Adobe Acro...	05/02/2004 11:34 PM	49,264	18%	37,362	
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Software brochure 0503-05-1203-737781.doc	Microsoft W...	05/01/2004 10:28 AM	42,466	79%	33,466	
WinZip 9.0.0.0.pdf	Adobe Acro...	05/02/2004 04:41 PM	327,851	95%	305,618	
WinZip 9.0.0.0.pdf	Adobe Acro...	05/02/2004 03:33 PM	383,831	91%	350,267	

WinZip 9.0

WinZip 9.0 offers many features beyond the standard ZIP support found in Windows XP.

The ZIP format is easily the most popular compression algorithm in use today, readily associated with the well-known WinZip program. In a nod to the prevalence of this format, Microsoft even integrated ZIP compression into Windows XP. However, where ZIP support in the latter ends, WinZip is just getting started.

WinZip 9.0 introduces strong encryption for protecting the contents of archives: previous builds rely on the weaker Zip 2.0 encryption, but this version supports 128- and 256-bit key Advanced Encryption Standard (AES) technology. In order to encrypt your archives, simply select the level of encryption and choose a password.

In the past, ZIP files couldn't be larger than 4GB and archives were limited to 65,535 files. Thankfully, 64-bit file extensions are now supported, eliminating the 4GB and file storage caps.

The program also features a new level of compression called "enhanced deflate." For instance, it can compress a 110MB Outlook PST mail file to 82.5MB — the "normal" compression mode brings it down to 83.5MB, and Windows XP's built-in ZIP compression reduces the file to 83.6MB.

WinZip is easy to use, and owners of previous versions will be pleased to discover that they can still choose between the Wizard and Classic interfaces. This version neatly integrates into Windows — apart from adding basic zipping shortcuts to right-click menus, the Windows tool-tips feature let you preview the contents of zipped files.

So is it worth US\$29? If you already have Windows XP and only want to create and open zipped files, probably not. However, if you often need to span archives across multiple disks, create executable ZIP files, encrypt your archives, create 4GB+ archives or finetune the level of compression, WinZip 9.0 is a solid choice.

However, keep in mind that programs such as WinRAR can also create ZIP files, provide excellent compression and many other competitive features for a similar price.

Valens Quinn

Details

Contact	Macromedia
Phone	1800 001 014
Online	www.macromedia.com/ap
Price	\$1,885 (upgrade \$630)
✓	DVD content support; project control.
✗	Steeper learning curve than Flash.
Verdict	●●●●○



Macromedia Director MX 2004

Interactivity is the name of the game with the latest version of this popular Web authoring tool.

Macromedia Director ruled the multimedia content creation industry in the mid '90s, offering tools to deliver interactive content either on CD, over a company intranet or on kiosk outlets. Now Macromedia is hoping Director MX 2004 can reassert itself by providing the tools to create interactive content for DVD, CD and broadband.

The scope of Director MX 2004 is impressive, going way beyond a simple vector-based creative environment. It supports most major video, audio, bitmap, 3D and vector formats.

The DVD authoring environment is well-suited for delivery of high quality interactive multimedia and many of the more powerful new features in Director MX 2004 reflect the significance of the DVD format.

DVD-Video, Windows Media, RealMedia, QuickTime and Flash Video compatibility means developers can embed, control and play back video content within multimedia projects and easily export them as Shockwave files.

Controlling scripts and actions has always been an important element for Director users, and the latest version allows interactivity within projects using JavaScript, Lingo or a combination of both.

Altering your workspace is also easier with Director MX 2004, with the ability to tailor the general GUI to accommodate the way you want to work. Output options have also been streamlined, with one step online publishing to the Mac and Windows platforms.

Although there is a large area of commonality, Director handles some areas better than Flash. You might need to decide whether a Director or Flash environment is suitable for your work.

Director is a better tool for interactive content. It delivers greater control over the delivery environment and the ability to deal with complicated interface programming, whereas Flash excels in projects where interface design and animation don't demand too much interaction to operate. With broadband transfer speeds fast approaching that of the CD-ROM (150KB/s), Director MX 2004 has the perfect pedigree to deal with the current high-speed Web environment.

Denis Gallagher

priced to mesmerise

The ASUS A25H is a notebook that will mesmerise you. Firstly it is pack with a full list of practical features at a great price. But that's not all. Whether you are in a business conference or relaxing at a café, the A25H is your reliable and robust companion.

For connectivity, imagine the support of 5 USB 2.0 ports enabling you to hook up multiple peripherals easier and faster.



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PLE Computers

02 6257 1808
08 9201 2788
08 9227 8588
08 9309 4771

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www.asus.com.au

Details

Contact	BlueChip Infotech
Phone	1800 803 802
Online	www.bluechipit.com.au
Price	\$599
✓	Excellent sound; FM tuner; SD/MMC slot.
✗	Poor playlist software; Windows only.
Verdict	●●●●○

S-Media CoCoPod

S-Media brings a solid offering to the competitive portable MP3 player market.

Following the success of Apple's iPod, many companies have sought to cash in on the portable music player phenomenon by producing easy-to-use and stylish hard drive-based devices. And S-Media's kookily-named CoCoPod is no exception.

The CoCoPod boasts a 20GB hard drive, USB 2.0, FM receiver and a number of recording facilities. Weighing in at 158g (including the built-in, rechargeable Lithium-ion battery) and measuring 11.1 x 6.9 x 2.2cm, the unit is a comfortable pocket companion for day-to-day use.

It doesn't match the build quality of the iPod, and navigating with the roll-and-click type scroll wheel isn't anywhere near as elegant as the iPod's circular touchpad, but it works well.

Support is provided for MP3, WMA and WAV files, as well as the ability to record on-the-fly and from the FM receiver in the MP3 format. The unit also includes an SD/MMC reader, a built-in microphone for voice notes, and a line-in connection for

recording from sources such as a stereo system or mixing deck.

When it comes to software compatibility, S-Media has taken the easy path, using a plug-in for Windows Media Player 9 to transfer files. There is no support for Mac or Linux, but Mac users won't be too concerned since they have a superior product in the iPod.

Playlists can be created and edited on the device, though a playlist editor is installed with the Windows Media Player plug-in, letting you create and manage playlists from your PC. However, it doesn't offer anything over the functionality of the unit. The CoCoPod also acts as a portable hard disk drive, appearing as a removable storage device in Windows Explorer.

The quality of audio reproduction is good across all formats, and the CoCoPod has no trouble playing back 256Kbit/s MP3s. The built-in equaliser with presets and user-definable settings lets you adjust the output of the player for the type of music you're listening to.

Although the 20GB iPod sells for the same price, the CoCoPod's additional functionality makes it worthy of consideration.

Nick Race

Details

Contact	Apple Computer
Phone	www.apple.com.au
Online	13 36 22
Price	\$TBA
✓	Gorgeous looks and sound.
✗	Only 4GB of storage.
Verdict	●●●●●

Apple iPod mini

It's small and stylish, but how does the tiniest iPod measure up against its bigger brothers?

The latest addition to Apple's successful iPod family is the iPod mini. As the name suggests, it's smaller than its predecessors — it measures 9.1 x 5 x 1.2cm (HWD), weighs only 102g and has a 4GB hard drive. The case is constructed from scratch-proof anodised aluminium (available in five colours) and has rounded edges for more comfortable handling.

Navigating through playlists and files is easy with the Click Wheel — a combination of the larger iPod's four buttons and scroll wheel in a single, touch-sensitive control.

Audio quality is excellent, with support for MP3, MP4 (AAC), and Audible audiobook formats. But if you're into WMA, you're out of luck. The supplied headphones give good bass response and plenty of volume, thanks to neodymium driver magnets.

The supplied iTunes software for Windows and Macintosh can automatically synchronise

files between a music library and the iPod, or users can manually transfer songs or playlists. The player can't be used while connected to a PC, but iTunes can play back music files stored on its hard disk.

Unlike its predecessors, the iPod mini is bundled with USB 2.0 and FireWire cables, and its built-in Lithium-ion battery can charge off either port.

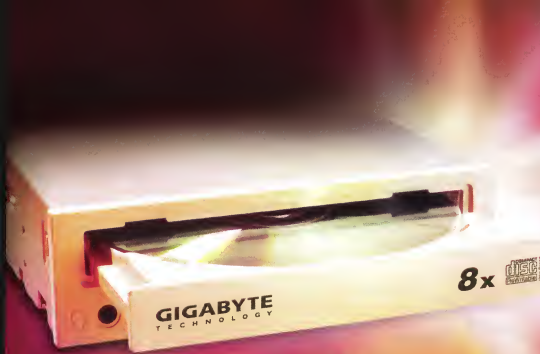
After a few discharge cycles, the player measures an average of seven hours and 30 minutes of continuous playback. This is respectable given its tiny size, but still less than the promised eight hours.

On the software side, the iPod mini includes a bevy of extras: alarm clock, notes and games such as Solitaire and Music Quiz, which uses your own music library as source material. A beltclip is also thrown in for good measure.

The 4GB of storage space could make you wish for a smaller music collection. Even though there won't be a huge price difference between the iPod mini and the 15GB model, it's still hands down the sweetest digital music player on the market.

David Emberton





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Writing

4X
DVD±RW
Writing

4.7GB
DVD Capacity

DVD dual

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GO-W0808A

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Writing data into disc just as easy as save into Hard Disc



52X-COMBO GO-85232A

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- VAS vibration reduction system
- Support Mt. Rainier format
- 17 cm low profile design



CD-R/RW GO-R5232A

- Data Transfer Rate:
Read : 52X max
Write : 52X max
Rewrite : 32X max
- Disc Loading : Tray (optional)
- Installation Angle : Horizontal, Vertical (optional)
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Details

Contact	Forward Solutions
Online	www.4migo.com
Price	128MB, US\$149.95; 256MB, US\$199.95 plus shipping.
✓	Comprehensive and easy-to-use synchronisation software.
✗	No USB 2.0 support: needs storage beyond 256MB.
Verdict	●●●●○



Forward Solutions Migo

Migo is a handy way to take desktop, personal files and mail to virtually any Windows PC.

While there are a flood of removable USB storage devices on the market, few have the ability to automatically take a snapshot of your PC and replicate it on different Windows machines. But Forward Solutions' Migo makes this possible by coupling a standard USB 1.1 flash memory key with special synchronisation software.

All you need to do is insert the Migo into your computer's USB port and run the PocketLogin synchronisation software that permanently resides in the key. The Migo has two modes of operation: Synchronisation or Login. On PCs using the former mode, you can record your desktop image, documents, programs, photos, MP3s and Internet Explorer Favorites. It even copies Outlook mail, contacts, calendar, notes and account settings. It can be set to discard data older than a certain number of days to prevent filling up the memory. This data is stored in a sync profile for that PC, and can then be synchronised with any other machine.

The Login mode lets you temporarily store your data on a PC. After transferring your desktop

(including wallpaper and icons) and files from a Synchronisation PC, sticking the Migo into a Login computer replicates all of the transferred files and settings, complete with a My Documents folder, other folders and file shortcuts. If Outlook 2000, 2002 or 2003 is present, Migo automatically enters your data and connection settings, allowing you to send and receive email. Once you've finished, Migo records any changes made to files and settings stored on the key and applies them to the original computer — and no trace of your data is left on the Login machine once you've finished.

Even working with multiple Synchronisation computers is easy. On a Login machine, a tab at the top of the screen shows thumbnails of each sync profile created. For additional security, the device can also be protected with a password.

The Migo provides a convenient means of keeping a central repository of personal files and Outlook data, and also means you don't have to juggle different file versions on each computer you work on. It's available in 128MB and 256MB denominations, but keep in mind that expensive international postage rates could push the Migo out of your reach.

Valens Quinn

Details

Contact	Cassa
Phone	(07) 3853 5444
Online	www.cassa.com.au
Price	\$198
✓	Inexpensive; tiny; bus-powered.
✗	Doesn't support WPA encryption.
Verdict	●●●●○



ASUS Pocket Wireless Access Point WL-330

Slightly smaller than a deck of cards, this Wi-Fi adaptor is an example of true innovation.

Not only can this pocket-sized 802.11b Wi-Fi adaptor connect an Ethernet-enabled PC to a wireless network, but it can also become a wireless access point.

This wireless gizmo is a bit bigger than a deck of cards — it measures 1.7 x 6.2 x 8.6cm (HWD) and weighs only 62 grams. It's smaller than most wireless access points and ideal for portability.

Switching between the wireless adaptor and access point modes is as easy as flicking the small slider switch on the bottom of the case. The supplied (Windows only) utility disk makes it easy to set up the device by guiding users through the configuration settings for each mode.

One deficiency is that, unlike some other wireless access points, it can't change the IP address of the device. If you've changed the IP address of the router, you can't reset the IP to the standard IP using the ASUS utility.

If you're a notebook user after a portable Wi-Fi adaptor, the WL-330 is a good choice because it

uses standard Ethernet for connection rather than USB device drivers. This is particularly important if you prefer Linux or Mac OS X. It ships with a USB cable to power the device. If you want to set it up in a more permanent location, you can use the supplied power pack.

Xbox and PS2 users may also find the WL-330 useful. It's the first device we've seen that can wirelessly connect a console to a network in its wireless adaptor mode. Because it uses Ethernet for connection, gaming consoles think they're connected via an Ethernet cable to a network. Of course, the WL-330 needs to be set up via a computer first as a console can't access the device's settings via a Web browser.

The only downside to this device is that it doesn't support the newer, more secure WPA encryption. However, its firmware is upgradeable, so hopefully ASUS will add this feature in the future. It's also worth noting that the WL-330 isn't a router, so don't expect to connect it to a plain ADSL modem and get features like Internet connection sharing and ISP login handling.

Dan Warne



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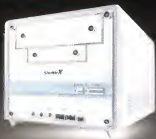
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Details

Contact	Group Services and System Pty Ltd
Online	www.groupservices.com.au
Price	\$299.95
✓	Simple, works well.
✗	Poor presentation.
Verdict	●●●●○

PhotoVista Panorama 3.02 Business Edition

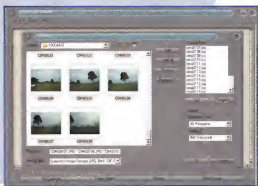
PhotoVista is a must-have stitching tool for photography buffs, architects and artists.

Isemedia's PhotoVista Panorama is one of a new generation of apps that stitches separate photographs together to form a single image, in this case a 360 degree panorama. There's no need for special cameras — the software joins images from standard equipment. All it needs is a series of angle shots taken from roughly the same location.

PhotoVista's non-standard Windows interface gives it a deceptively poor first impression.

However, the program is fast, simple and easy to use. The default settings work well enough for beginners, and a manual is provided for achieving more sophisticated results.

There is a standard version of PhotoVista Panorama 3.02 available (\$99), however, the Business Edition includes a number of features to streamline office use. The network publishing feature is designed for uploading projects to an Internet imaging server, and works equally well for FTP shares.



We imported and sorted a selection of images, which were then bent, warped and assembled into a full 360 degree wraparound. Even photos that aren't taken with a tripod-mounted camera come together well.

PhotoVista has a comprehensive list of lens types for the different brands and models of cameras. These profiles act as a guide, and improve the application's blend quality, by telling users how many pictures to take based on the lens.

After a quick preview, a full resolution stitch can be created. Each photo's overlapping regions are analysed and blended according to the specific lens geometry. The final stitched file can be converted to cubic or cylindrical 3D (for QuickTime), saved, published to a server, or turned into a screensaver. A flat/3D quick viewer is included, and files can also be previewed in a browser.

Isemedia bundles VuForge with PhotoVista — a Java program that assembles various types of viewer applets. VuForge allows for custom colours, toolbar graphics and orientation. These applets can be uploaded to a Web server and used to deliver the images online.

David Emberton

Details

Contact	2Entwine
Online	http://2entwine.com
Price	Free
✓	Good mix of features.
✗	No network interoperation.
Verdict	●●●●○

2Entwine Gush

If you're after an all-in-one communications medium, Gush may be just the ticket.

With a wealth of instant messaging (IM) clients freely available on the Internet, smaller players have to offer more than just the usual features to stand out. By merging IM with other online communication tools, Gush strives to do just that.

In Gush, the buddy list has a sophisticated database and a virtual desktop interface enhanced by syndicated news feeds. This results in a social information centre of sorts, that blends the Web with scheduling and notification.

Chatting with Gush is done through the Message Center, which works as a central text entry point for all ongoing IM conversations. Instead of having a text box under every chat window, the Message Center accepts input whether it's in the background or not. This also allows users to send a single message to multiple buddies at the same time.

Blogging in Gush takes the form of Announcements, which can be intended

for all buddies or just a single group. All entries are archived and can be browsed via date. Announcements can also double as a record of comings and goings, which can then be taken in via the News Reader.

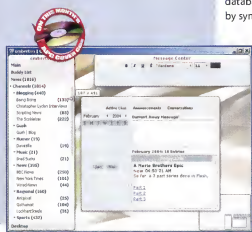
Since Gush relies heavily on the Jabber network, it could use a better buddy discovery mechanism. Unfortunately Gush doesn't have a matchmaking or user directory feature, nor does it interoperate with the more popular AOL, MSN, ICQ or Yahoo! IM networks.

The entirely left-click interface can become annoying. Although it works well, users accustomed to clicking on white space to cancel an action will tire of the context menus that appear instead.

The best features are Conversations (which, like Announcements, displays previous chat session subjects by month and day), Jabber-based security, and multiple virtual desktops for window organisation.

Gush probably won't replace your current instant messaging setup, but it will make you realise what you're missing out on. This is well worth the 7MB download.

David Emberton





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Wide-screen DLP and LCD projectors

As LCD and DLP projectors drop in price, more people are choosing wide-screen units for home cinema and the office. *Troy Michlmayr* tests four top contenders.

In the booming home cinema market, projector sales are sky-rocketing. Most projectors operate in a 4:3 aspect ratio natively and handle 16:9 wide-screen movies by "letterboxing", displaying black bands on the top and bottom of the screen. But this Labs Challenge purely focuses on units operating natively in wide-screen mode.

Wide-screen projectors have obvious benefits over conventional models: the majority of new movies on DVD, for instance, are recorded in that format, and projectors are already a viable alternative to large LCD or plasma screens for home cinema use.

As with high-end televisions, it's vital to pay close attention to image quality, brightness, contrast and colour balance. Most projectors offer a range of VGA, S-Video, DVI and composite inputs, while some higher-end models also have RGB or RGB-HV connections.

The ability to project an image upside down is crucial if you're planning to attach the unit to your ceiling. Of course, running the projector offset from the screen will generate a distorted picture unless the projector is able to keystone the image to correct the visual effect of projecting onto an angled surface. Unfortunately, this puts strain on the projector's internal components, and it's not uncommon for the edges of the screen to oscillate under extreme keystoning.

Most projectors require some tweaking to yield an optimal image, so a well-designed, easy-to-use menu system is also important. Excessive internal heat can also affect the life of a projector, so it's important to select one fitted with an effective cooling system.

Traditionally, LCD projectors have offered superior colour saturation over their DLP counterparts. That gap is narrowing, but it hasn't been completely closed. So, while LCD models do tend to suffer from "jaggies" during keystoning, they offset this disadvantage by producing slightly better images.

How we tested

Each projector was set up in a controlled dark room on a 1m high desk, 2.5m away from a screen, using DVI and VGA inputs from a wide-screen Acer notebook. All picture quality tests are subjective, but individual screen brightness was measured using a light meter. Brightness was sampled at the centre and edge of the projected image and factored in along with image quality, range of adjustment, keystone features and contrast levels. Units with built-in lamp meters and picture-in-picture support were given bonus points, but this wasn't a focus of the roundup. A standard wide-screen test pattern was used to measure colour balance, contrast and detail.



Panasonic PT-AE500E

Panasonic's entry impressed us when we tested it alone (APC March, page 56) and it still proves a winner. The PT-AE500E employs an LCD panel running at a native resolution of 1,280 x 720 pixels. It relies on a clever system called Smooth Screen to slightly obscure the intersections between each pixel and provide a clear, consistent projected image. It works well, producing the best image of all the units reviewed, with a smooth picture and even colour balance.

The AE500's video inputs include DVI, VGA, composite, S-Video, Scart, component RGB and a trigger, but no audio inputs — a drawback if you plan to use it for presentations. The remote control and menu system are easy to access and responsive, allowing a fine degree of control. Brightness and contrast can be corrected through a wide range, and the sharpness adjustment is outstanding.

The image remains extremely stable in all screen modes. Some oscillation is visible at the edges, but the overall picture quality is certainly the highest of all the units examined. The default picture is good and the brightness and colour require little tweaking. There is ample adjustment in colour temperature to compensate for differing ambient light conditions.

The machine features several picture modes, each making a dramatic difference to colour balance and temperature. It doesn't include the picture-in-picture capability found in some other review units, but this isn't a great concern for most buyers.

Vertical and horizontal keystone adjustment is effective and the image remains extremely stable at its most extreme settings, even when flipping between 16:9 and 4:3 aspect ratios. The projected image can be flipped for roof-mounted operation and the machine can also mirror the image if it needs to be run in a rear-projection situation.

The Panasonic's 850 ANSI lumens lamp is rated to 2,000 hours, shutting down automatically once that limit is reached, and the user can control lamp brightness and fan settings from the menu. The machine runs quietly and is relatively cool, even with the lamp at its brightest and the fan operating at full speed. And while a little internal light does leak around the rear of the unit, it's not enough to be distracting.

The Panasonic PT-AE500E is the best all-round wide-screen projector in this pack.

Details

Contact	Panasonic
Phone	13 26 00
Online	www.panasonic.com.au
Price	\$3,899
✓	Great all-round package.
✗	No audio input; no picture-in-picture; simplistic manual.
Verdict	★★★★

Toshiba ET1

The Toshiba ET1 is certainly the most distinctive-looking projector in this Labs Challenge, and its quality doesn't disappoint.

The unit produces a huge, wide image with excellent colour balance, although it isn't as clear as the Panasonic. The picture appears a tad jagged but remains exceptionally stable, even under keystoneing. While vertical keystone adjustment is limited in range, the projected image doesn't suffer from noticeable oscillation. A horizontal adjustment option isn't offered.

The ET1 relies on an 858 x 480 pixel LCD to produce its image. While this constitutes the lowest resolution screen of any of the units on test, it still provides a clean, even picture. On the other hand, the low contrast ratio of 800:1 means the image is a little washed out, and the brightness rating of 400 ANSI lumens is less than half that of its nearest competitor in this roundup.

Although the Toshiba is ceiling-mountable and the picture can be flipped through 180 degrees or reversed for rear-projection, there's no external zoom control on the lens, so internal adjustments must be relied on to fit the picture to a screen. The unit's stereo audio output is passable for watching a DVD, but this is hardly a feature you'll want to use in place of a full surround sound system in a home cinema setup.

Surprisingly, the ET1 doesn't feature a DVI input, despite the fact that VGA, S-Video, RGB and composite inputs are all present. This

is lamentable enough if you're running the unit in a lounge room, but a bigger disappointment for heavy gamers.

A well laid-out remote control ships with the unit and can be used to quickly toggle between 16:9 and 4:3 aspect ratios. The onscreen menu is also clear, making it easy to adjust colour, contrast, brightness and sharpness.

Internal fan noise is loud, and although the Toshiba can switch speeds depending on the lamp brightness, it's still distracting. However, the beefy fan system keeps the ET1 cool. There's minimal light spill around the front or rear of the machine, even at the lamp's brightest setting.

The ET1 is a well-designed and functional wide-screen projector, but its comparatively low specs drag it down.



Details

Contact	Toshiba
Phone	13 30 70
Online	www.isd.toshiba.com.au
Price	\$3,499
✓	Clear menus; stable image.
✗	Lacks DVI input; noisy.
Verdict	●●●○○

Projector specifications

Model	BenQ PE8700	Mitsubishi HC3	Panasonic PT-AE500E	Toshiba ET1
S-Video	✓	✓	✓	✓
VGA	✗	✓	✓	✓
DVI	Yes, with cable to connect from VGA	✓	✓	✗
RGB	Yes, and RGB-HV (BNC)	✗	✓	✓
Scart	✗	✗	✓	✓
Composite	✓	✓	✓	✓
Optical	✓	✗	✗	✗
RCA	✗	✓	✗	✓
Walkman-style	✗	✗	✗	✗
Technology (DLP/LCD)	DLP	LCD	LCD	LCD
Native resolution (pixels)	1,280 x 1,024 (4:3); 1,280 x 720 (16:9)	960 x 540	1,280 x 720	858 x 480
Rated output (ANSI lumens)	1,000	1,300	850	400
Lamp life under normal operation (hours)	2,000	2,000	2,000	2,000
Contrast ratio	2,000:1	500:1	1,300:1	800:1
Picture-in-picture support	✓	✗	✗	✗
Vertical keystone	✓	✓	✓	✓
Horizontal keystone	✗	✓	✓	✗
Ceiling mountable	✓	✓	✓	✓
Rear-projection	✓	✗	✓	✓
Remote control	✓	✓	✓	✓
Ships with carry case	✗	✗	✓	✓
Replacement bulb cost	\$899	\$849	\$699	\$419
Warranty policy (years)	3	2	2	2
Dimensions (HWD, cm)	13 x 40 x 30	8.5 x 28 x 27	8.5 x 28 x 28	13 x 32 x 33
Weight (kg)	6.7	2.7	2.9	3.5



BenQ PE8700

BenQ's DLP-based PE8700 is the biggest wide-screen projector in this roundup, and also one of the best. Although it's aimed primarily at serious home cinema systems, the PE8700 makes it into the test by virtue of being BenQ's flagship wide-screen model.

The PE8700 offers a wide range of video inputs, including RGB-HV professional-level BNC connectors, RGB, composite, S-Video, DVI and a VGA to DVI adaptor cable. However, there are no audio inputs — a surprise considering its massive size (13 x 40 x 30cm).

The projected image is clear, bright and sharp, thanks in part to 1,000 ANSI lumens lamp. The default colour balance is outstanding but there are three user-defined colour settings if you like to tweak. Brightness, contrast, sharpness and tint are all adjustable via the detailed onscreen menu. The menu system is intuitive and offers control over individual colour levels.

The aspect ratio can be switched between 4:3 and 16:9 using the remote control, and picture-in-picture is supported. The menu even includes an alignment grid so you can finetune your display settings. The BenQ is interesting in that it can run in different native resolutions, depending on the aspect ratio — the image is displayed at 1,280 x 1,024 pixels when operating in 4:3 mode, and 1,280 x 720 pixels in 16:9.

The lamp life is rated at 2,000 hours of normal operation and its status can be checked at any time from the onscreen menu.

Only vertical keystone is available, but the range of adjustment is outstanding and the picture quality is superb — the image remains extremely stable and sharp even under heavy keystoneing. The projected image can be flipped for ceiling mounting or reversed to support rear-projection. The unit weighs over 6.5kg, so ceiling mounting is a sensible option.

The BenQ PE8700 is whisper-quiet during operation and always keeps its cool. A generous bundle of extras includes printed and CD-ROM-based manuals, remote control and a wide range of extra cables. The three-year warranty is also appealing for many consumers, especially given the \$9,999 price tag.

As the most expensive projector in the test, the BenQ should produce an image considerably better than the other units. Sadly, while the output was clear and bright and the range of inputs was good, it doesn't do enough to justify the extra expense.

Details	
Contact	BenQ
Phone	(02) 9714 6800
Online	www.benq.com.au
Price	\$9,999
✓	Excellent image; remains cool.
✗	Size; weight; no VGA.
Verdict	●●●●○



Mitsubishi Electric HC3

The Mitsubishi Electric HC3 is something of a mixed bag. While it's one of the smallest units on test, it appears to be at the expense of features that are standard on many of its competitors.

The LCD-based unit offers two aspect ratios (4:3 or 16:9), selecting between the two automatically based on the source material. It can also stretch a 4:3 image to wide-screen. The unit only provides VGA and composite video inputs, yet offers RCA audio connectors, which constitute a slight cost saving.

While the 1,300 ANSI lumens output is the brightest of all the machines tested, the HC3 fails to impress. The unit's 960 x 540 pixel native resolution is the second lowest of all the machines tested. At its default settings, contrast and colour saturation is lacking, and the sharpness also suffers. Dark text on a white background appears blurry on screen, as do dense lines. And although brightness and colour balance are even, images are washed out and the adjustments via the menu offer insufficient range to correct the problems. Like most other units, the lamp is rated to 2,000 hours of normal operation.

The Mitsubishi's fan is louder than all the other machines in this roundup during normal operation, and the noise increases noticeably when the image is at its brightest setting. So don't consider running the HC3 in a lounge room as part of a home entertainment system; the fan is simply too distracting. The same goes for most corporate boardroom presentations. On a more positive note, the Mitsubishi has minimal light spill around the front of the machine, although a little is visible around the unit's side grille.

The onscreen menu is quite difficult to use. Adjusting picture qualities to render a clear, accurate image is possible, but it takes some time. The button layout is also clumsy — the menu and power buttons sit side by side on the remote control and it's easy to accidentally turn the power off. On the plus side, the remote can also be used to drive a standalone DVD player or VCR.

The machine can rotate images and supports ceiling mounting, but can't reverse images to suit rear-projection. One saving grace is a wide and effective vertical and horizontal keystone adjustment. However, the limited range of inputs, poor picture quality and sluggish menu system count against the HC3.

Details	
Contact	Mitsubishi Electric
Phone	(02) 9684 7777
Online	www.mitsubishi-electric.com.au
Price	\$3,990
✓	Remains cool during operation.
✗	Poor image quality.
Verdict	●●○○○

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DVD authoring

Want to preserve your latest video masterpiece for posterity? *Serdar Yegulalp* tests six DVD authoring packages and finds something to suit every budget.

The desktop video revolution makes it possible for everyone to produce professional-looking home movies — even if the performances aren't Oscar-worthy. Editing video on the humble home computer is a relatively easy task to master, and the increasing affordability of DVD burners makes it possible to generate your own DVDs as well.

The best part about the newest DVD authoring applications is that they contain sophisticated features formerly costing thousands of dollars and available only to professionals. These include subtitles, region coding, multiple audio tracks and copy protection. This means that professional DVD authoring is now more accessible for indie filmmakers, desktop producers and even the casual user — people who want power and a varied feature set, but can't afford to bankroll a bigger production.

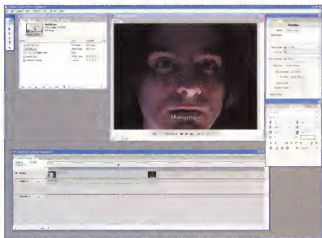
For this month's Labs Challenge, APC looks at a range of new or newly-revised DVD authoring programs to fit a broad variety of needs and budgets. Not everyone requires a complete solution; some may already have video editing programs and are simply looking for a way to make DVDs from a library of pre-encoded clips.

The level of expertise needed to run each of these programs varies greatly. For instance, DVD-lab is a program for expert desktop video-makers — not just because of its mix of features, but because no encoder is bundled with the package (although one is available for a nominal price), and supplying pre-encoded video can be pretty complicated. On the other hand, Ulead's DVD Workshop contains a great many professional features (region coding, copy protection), but they're presented for use in a very straightforward, step-by-step interface. Pinnacle Liquid Edition includes a full video editing suite along with DVD creation tools for those starting with just raw footage.

In this case, the most expensive and feature-laden programs aren't necessarily the best or the easiest to work with. Adobe Encore, for instance, features just about everything you could ask for, but also has a very steep learning curve. Others, such as DVD Workshop, don't quite have everything, but more than make up for it by virtue of being easy to use.

How we tested

All of the programs were run on a dual-processor AMD Athlon MP 2400+ computer with 1GB of RAM and 160GB of storage. The encoding benchmark consisted of transcoding and authoring a one-minute NTSC DV video clip, along with a single menu, to the computer's hard disk. Some programs (such as Sonic RealDVD) did not include a transcoder, and so were not tested in this fashion.



Adobe Encore DVD

Adobe, creator of Photoshop and Premiere, has now turned to DVD authoring. Version 1 of Encore is packed with almost every conceivable feature, and it executes them to perfection. However, it does lack in a few key areas and it only runs on Windows XP.



Like Adobe's other applications, Encore uses a floating-palette interface most closely resembling Premiere. Video, audio and still images imported into Encore are "assets", which can be dropped into blank menus and timelines. Both video and audio tracks can be trimmed, although not independently if they're from the same file. Menus and timelines can be created and then linked in any order, and the user has full control over the behaviour of both. These associations need to be created manually, so a certain amount of plugging things in is needed before previewing works.

Almost any image can be imported and used as a menu background, button or subpicture object. Subpicture colour palettes can also be easily edited. Subtitles (with full language selection options) can be added by hand, or pre-generated subtitle images can be imported from a third-party program script (such as FAB Images). Unfortunately, you can't feed the program an SSA-style timed script and have it automatically generate titles — a major let-down for an otherwise powerful product.

Encore provides a broad range of useful transcoding presets, such as 16:9, 4:3, single-pass, dual-pass, constant bit rate and variable bit rate. If you don't like what you see, you can create your own compression settings, right down to options like P and B frame frequency. Audio is less flexible, amounting to little more than a choice between Dolby Digital and MPEG audio bitrates (PCM is fixed at 48kHz). There's no way to passively encode content while working on other things, and no built-in way to monitor the bit rate of a transcoded file or make frame-specific encoding hints.

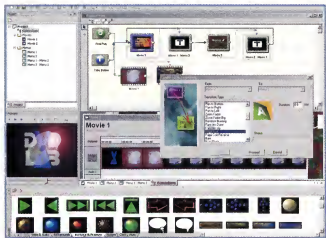
A big selling point for existing Adobe users is its tight integration with other Adobe products.

Details

Contact	Adobe
Phone	1300 550 205
Online	www.adobe.com.au
Price	\$869
✓	Tight integration with Adobe products; feature packed.
✗	Weak handling of subtitling.

Verdict





MediaChance DVD-lab 1.3

DVD-lab is an incredibly inexpensive DVD authoring kit that contains some excellent features not found in any other package here. It's still in its infancy, however, and is recommended only for experts.

The main way DVD-lab keeps its cost down is by not having a built-in MPEG encoder, which incurs royalties. Any third-party MPEG-compatible encoder will work, and MediaChance sells a special version of DVD-lab with a low-priced encoder, the highly-regarded and powerful TMPGEnc (US\$29). In a way, this isn't such a bad thing, since many professional DVD creators (the target audience) will already have an encoder.

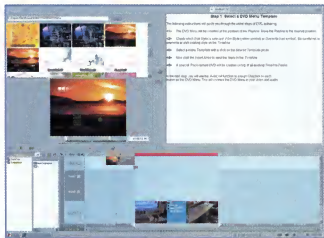
DVD-lab organises a DVD project into several basic categories: movies (into which audio and video tracks are dropped), menus and slides. The layout of the DVD is organised through a powerful flowchart-like tool, which allows you to see at a glance how titles and menus connect with each other.

DVD-lab includes some features found in no other program here: a bit rate chart for video files; an NTSC overheat graph, which indicates whether or not still menus with non-NTSC-safe colours run the risk of causing monitor burn-in; a DVD topology chart, to show where each file will be burned on the disk; and many additional tools for handling audio streams. There is also an excellent suite of integrated utilities for creating motion menus, including moving menu-to-menu transitions.

The bad news about DVD-lab is that key features found in other programs are missing, including subtitling, copy protection, multiple audio and video streams, and output to an ISO file. The most glaring and annoying omission is the lack of full DVD simulation — if you want to test the disc, it has to be created and played back on a standalone player. However, in terms of value for money, DVD-lab is worth considering.

Details

Contact	MediaChance
Online	www.mediachance.com
Price	US\$99; optional encoder, US\$29
✓	Many features not found in other applications.
✗	Encoder not included; still rudimentary in some ways.
Verdict	●●●○



Pinnacle Liquid Edition Pro 5.5

For those who need a complete solution for creating polished video from raw material to finished disk, Pinnacle Liquid Edition 5.5 is nothing if not complete. But the package isn't consistent: it overkills some features while skimming over other, more crucial functions such as DVD creation.

Liquid Edition 5.5 uses a very complex workspace for both video editing and DVD creation. Because the program uses timelines for storage, it can be difficult to see at a glance where everything comes from or goes to. Ulead's DVD Workshop suffers from the same problem, but at least its workflow is clearly laid out.

Those familiar with Pinnacle's other video editing programs should be reasonably comfortable, but newcomers will need to take the time to figure it out. The video editing side of the program is extremely powerful, loaded with features such as titling and sophisticated real time effects.

DVD creation is a two-fold process: one, create DVD menus and link them to various video timelines; two, master the results to disk. Creating links from menu items is as simple as placing markers in the timeline, and then linking those markers to menu objects. The program contains a nice selection of pre-generated menus, which can be edited as needed.

In terms of DVD creation, there's no support for multiple audio or video tracks, no way to do subtitles, and no support for exporting to digital linear tape (DLT), which means copy protection and region coding are missing.

Another major drawback to Liquid Edition is its interface. In use, it creates its own desktop on top of the existing Windows desktop, going so far as to change the colour scheme while it's running (although minimising it disables the colours). It's also somewhat unstable: it was the only program reviewed to crash during use.

Details

Contact	Lako Pacific
Phone	1800 657 601
Online	www.lakopacific.com
Price	\$2,200
✓	Full-featured video editing suite included.
✗	DVD export is minimal.
Verdict	●●○○

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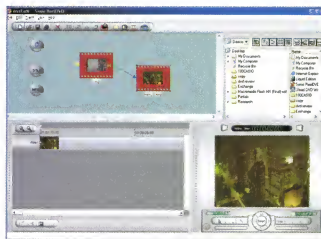
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Sonic ReelDVD 3.1.1

According to its press release, Sonic ReelDVD is aimed at professionals and independent filmmakers. However, it lacks many useful features offered by other programs in this roundup. For one, there's no video transcoder included. Considering that most of the competing programs in this test have one, integrating a video transcoder into the package isn't too much to ask, especially at this price.

Like DVD-lab, ReelDVD uses a flowchart diagram to show how the video clips and menus in a given project link to each other. Each project comes with pre-created objects that allow the user to link to video or menu clips for when Play is first pressed, or for whenever the Title button is pressed.

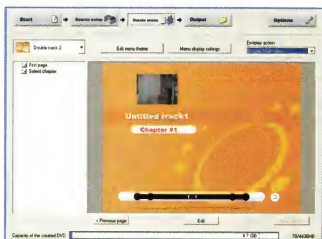
All the assets for a project — including graphics for menu buttons — must be created outside the program and imported separately. For instance, there's no way to put quick text buttons on a menu by simply clicking and typing the text. Creating a DVD in ReelDVD requires more graphics prep work than any other program here.

New to the program from previous versions is the ability to add multiple audio tracks (although not video) to a given video program, and multiple subtitle tracks as well. Subtitle script files can be created, but only as references to image files (as per Adobe Encore), or they can be selected and input by hand.

The limitations of the program outweigh a lot of its benefits. Only one video title set is allowed per project, so there's no way to mix and match video types (16:9 versus 4:3 and so on). A completed project can be authored directly to a DVD, image file or DLT (if available), but the options for output to tape are very limited compared to Adobe or Ulead.

Considering the relatively steep price tag, Sonic may be overly optimistic in the power of its brand name, especially considering that there are far better, more complete and easier-to-use programs available for the same money. However, a newer version of the program with more features is expected soon, so a follow-up may be in order.

Details	
Contact	H-Digital
Phone	(02) 9929 0222
Online	www.h-digital.com.au
Price	\$990
✓	Supports external titling.
✗	No transcoder included; many limitations.
Verdict	●●○○○



TMPGEnc DVD Author 1.5

DVD Author 1.5 is a very simple authoring program that does just one thing: it takes encoded clips and produces a playable DVD from them. It's perfect for people who need to create simple DVDs from video clips without spending a lot of money, or who need to render a lot of DVDs in an assembly-line fashion.

Similar to DVD Workshop 2.0, DVD author uses a series of workflow menus. The first is for creating a new project or opening an existing one; the second is for selecting audio or video sources; the third for creating menus; and the final menu for rendering the results to a folder, DVD±RW drive or ISO file. The application supports multiple video programs, each of which can be allocated chapter points that can then be used to create motion menus. Setting chapter points and thumbnails is very easy, and video clips can have beginning and endpoints trimmed.

Video and audio sources are limited to a few basic formats: PCM, MPEG and Dolby Digital for audio, and MPEG files for video. The program doesn't support integrated transcoding, but the company does supply a very powerful standalone encoder, which can be used to easily generate the needed video and audio files. Video can also be copied from an existing DVD, provided the disc isn't copy-protected.

The program's real attraction is its very elegant system for automatically creating good-looking and consistent menus for video titles. A number of menu templates are included, and it's easy enough to create more or customise the existing ones. Also, the menu templates hold changes consistently: if you change the name of a chapter and then apply a new template, for instance, the chapter naming is retained.

More advanced DVD authoring features are absent: subtitles, multiple audio tracks, copy protection and advanced program chain editing. But given the low price and its intended scope, DVD Author 1.5 does the job well.

Details	
Contact	Pegasys Inc.
Online	www.pegasys-inc.com
Price	US\$68
✓	Inexpensive and easy.
✗	Encoder not included.
Verdict	●●●○○



Ulead DVD Workshop 2.0

DVD Workshop has evolved from a relatively simple mastering program to a powerful authoring package. It's also one of the easiest programs of its kind to work with, thanks to its simple and efficient interface. A row of tabs at the top of the screen makes the workflow intuitive, and many common functions are automated.

Video can be captured directly within the program through a full range of device-capture controls, import existing video files from the computer (any DirectShow-compatible format will do), or even import files from an existing, non-copy protected DVD. Video files are only transcoded and multiplexed at the very end of authoring, so the user can freely edit and manipulate raw files and preview the results without waiting for a transcode. Once files are transcoded they can be added to the project's internal library and re-used to save time in the future. Users can manually specify the aspect ratio for any clip (16:9, 4:3, letterbox and so on), although changing the aspect ratio of a clip requires that it be re-rendered if it's not already in MPEG format.

Most of the DVD creation process is via drag-and-drop operations. To create chapter stops for a title, all a user needs to do is point and click. Attractive menus can be created in only a few steps, and the same goes for motion menus: simply drag a title or chapter point into a menu and it turns into an animated button.

New to version 2 are multiple audio tracks and subtitles, and Ulead's subtitle editor is actually better organised and designed than Adobe's. Titles can be punched in directly or imported from a plain text script. You can't do automatic styles for subtitles and there's no support for Asian scripts (something Adobe has excellent support for), but these are offset by its relative ease of use. Also new is that each button or menu item can have a whole program chain assigned to it (subtitle/audio selections, and so on), instead of just a simple action. There's no support for multiple video tracks, so you can't do seamless-branching effects, but it's still quite useful.

Full support for output to DLT, along with region coding, CSS and Macrovision support has also been added to this version.

Details

Contact	Lako Pacific
Phone	1800 657 601
Online	www.lakopacific.com
Price	\$989
	Easy workflow.
	Poor support for Asian character sets.
Verdict	●●●●○

CSS, Region Coding and Macrovision

The DVD specification comes with several mechanisms for preventing copying or unauthorised distribution. Only recently have consumer-level DVD authoring programs started offering these features, so they may be unfamiliar to many people.

- CSS:** short for Content Scrambling System, this is an encryption system used to secure the contents of a DVD so that it cannot be copied out without damaging the data. Most big-studio DVDs are encoded with CSS. It's also been at the heart of a massive international legal debate: amateur programmers cracked CSS, published the descrambling algorithms openly, and were then taken to court for illegally revealing trade secrets.
- Macrovision:** a trade name for a patented anti-copying mechanism which prevents analog copies being made of DVDs by simply hitching a VCR to a DVD player. Using Macrovision requires a per-disc licensing fee. Unfortunately, many DVD/TV combo appliances don't work well with Macrovision-protected discs.
- Region coding:** to prevent the unauthorised distribution of a particular video title in a geographic region which it isn't licensed for, DVDs are fitted with a "region code" that only allows playback of the DVD on players sold in that particular geographical region:
 - USA, Canada
 - Europe, Japan, South Africa, Middle East, Greenland
 - Taiwan, South Korea, the Philippines, Indonesia, Hong Kong
 - Australia, New Zealand, South and Central America, Caribbean
 - Russia, Eastern Europe, India, Africa (except South Africa), North Korea
 - Mainland China

Discs can also be coded as "region 0", which essentially means no region code and can theoretically be played anywhere. It's also possible to code a disc with multiple region codes so that it can play in multiple territories. The prevalence of region-free and region-switchable DVD players, however, means that region coding may no longer be effective.



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802.11g access points

Wireless networking has become increasingly popular in both offices and homes. *Nick Race* puts 10 wireless access points on the hot spot.

With the growing interest in wireless "hot spot" access in coffee shops, libraries and other public places, an increasing number of networking product manufacturers have been working hard on their next set of 802.11g wireless access points. And thanks to the ease of getting new users or visitors onto your network, wireless networks are also creeping into the office environment, especially for companies with a lot of mobile staff.

The 802.11b standard was the first to market, offering 11Mbit/s transfers over a "long distance". As with most things in the computing world, speed was seen as a priority, and 802.11a followed close on its heels with 54Mbit/s, albeit at a much shorter range. 802.11g was then created to combine the best of both worlds — the speed of 802.11a with the range of 802.11b.

The 802.11g standard also added a new security feature, Wi-Fi Protected Access (WPA). WPA is a constantly changing key that prevents wireless snoopers breaking into a network by monitoring traffic and decoding the Wired Equivalent Privacy (WEP) key.

A wireless network can be a dangerous thing in the hands of the uninformed: if default SSIDs are used, or WEP keys not set, your network is wide open to anyone nearby with a wireless card. It's unfortunate that most of the units tested here have no default security measures in place, though responsibility for a network is always on the head of the administrator and its users.

Wireless equipment also suffers from a large case of specification bloat. Real world performance of equipment outside an RF lab rarely reaches the heady realms offered on the box.

For this Labs Challenge, we tested the units in environments they are most likely to be used in. No special considerations were made for existing networks, portable phones or microwave equipment in the area, and all were tested within a tight time frame to keep the conditions identical.



Level One WAP-0003

Security is a big concern for both network administrators and first-time users, and the Level One WAP-0003's approach to security is impressive. This access point supports 128-bit WEP encryption, as well as the ability to turn off SSID (service set identifier) broadcasting so only authorised users can access it. The WAP-0003 can also be configured to allow access from specific MAC addresses — useful for static network environments. Another useful function is the ability to enforce user passwords on the clients.

This unit is quite solid in terms of performance. The WAP-0003 is capable of 802.11g and b transfer modes and produces consistently high results. With a surprisingly strong result over the long distance measurement (an average of 14.5Mbit/s), it outpaces all other access points tested, with the D-Link DWL-2000AP coming in second at more than 2Mbit/s slower.

Setup of the unit was a simple task using software from the bundled installation CD. It doesn't use a wizard-based utility, but all settings are easy to access via the menu buttons. Basic settings are configured through the software application and advanced settings through the browser interface.

The access point can be configured to take its IP address from a DHCP server on the network, a broadband router or server unit. It can also act as a DHCP server on more simple ICS-based networks, or if your router doesn't support the function.

Wall mounting is an option for the WAP-0003. However, unlike the 3Com 8250 monster, its small size can easily be concealed or perched on top of a cubicle. In contrast to the enterprise level access points (such as HP and 3Com) the Level One box doesn't have any support for local administration via serial port or RJ11 connection. However, it does support SNMP for remote maintenance and reporting — a vital tool in any large networking environment.

Overall, the Level One WAP-0003 is a solid offering. It has good security functions, a small form factor, is easy to install and has the best throughput of the units tested.

How we tested

We tested throughput over time using Iperf 1.7.0 (<http://dast.nlanw.net>) to give an effective and accurate bandwidth measurement. These were taken three times and averaged at each distance. Iperf's service and the FTP server were run from a PC connected with 100Mbit/s Wired Ethernet to a 100Mbit/s switching hub.

The units were tested from the following distances: close range, less than 30cm from the WAP's antennae; medium range, 5m from the WAP within the same room; and long range, one floor beneath the WAP in the same concrete building.

Most tests used a Netgear WG511T wireless PC card in a Medion MD6100 2.6GHz P4 notebook with 512MB of RAM and Windows XP. Due to compatibility issues, the 3Com equipment had to be tested with a 3Com 3CRPAG175-AP PCMCIA card.

Details

Contact	Network Broadband Solutions
Phone	(02) 9212 2838
Online	www.netbro.com.au
Price	\$229
Close range	25.6 Mbit/s
Long range	14.5 Mbit/s
✓	Great performance; reasonable pricing.
✗	No serial or RJ11 connections.
Verdict	★★★★

3Com Wireless LAN Access Point 8250

The 3Com 8250 is the largest unit in this roundup, and also the most expensive. For the steep asking price, users get a professional-level access point with WEP support of up to 152-bit keys and a few special functions to make network management easier.

Power for the unit is provided by Power over Ethernet, meaning the cable that connects it to the network also supplies its power. Network setup involves mounting the unit on a wall (due to its large size, it would be impractical elsewhere), plugging the incoming Ethernet cable into the power supply, then a further cable into the unit. Hubs and switches can also directly power it, with Power over Ethernet ports built-in.

The usual Web-based configuration menus manage this unit, but the initial connection involves installing 3Com's bundled Wireless Infrastructure Device Manager to set the IP address. Out-of-the-box, it only supports 802.11g. However, upgrade kits that offer 802.11a and b support are available.



Overall the 3Com 8250 is a solid performer that offers no surprises, either with its capabilities or lack thereof.

Details

Contact	3Com
Phone	1800 678 515
Online	http://ap.3com.com
Price	\$988
Close range	0 20.6 Mbit/s 10
Long range	0 4.5 Mbit/s 10
✓	Excellent security; Power over Ethernet.
✗	Expensive; 11a and b support not included; slow at long distance.
Verdict	●●●●○

3Com OfficeConnect Wireless 11g Access Point

The 3Com OfficeConnect-branded access point offers very good performance for 802.11g connectivity. As one of the lower-end units supporting WPA, it sits comfortably in the middle ground. Test results show the unit to be a reasonable performer, coming in second in the medium-range testing and fourth in the long-range results.

The unit is managed via a Web-based interface, but the Access Point Discovery application searches your network for units that can be configured. This is easy to get up and running, requiring minimal tweaking to get the desired settings.

The OfficeConnect can also act as a wireless client for PCs or notebooks that don't have wireless cards. It can even act as a DHCP server for assigning IP addresses to wireless and wired client PCs. Security can be configured to use WPA for Windows XP clients, or WEP at 64- or 128-bit encryption for standard compatibility.

Unfortunately, no provision has been made for changing or

upgrading the antennae. The two dipole antennae attached to the unit cannot be removed or upgraded. Additionally, the OfficeConnect offers no external port for long range or higher-powered antennae.



Details

Contact	3Com
Phone	1800 678 515
Online	http://ap.3com.com
Price	\$179
Close range	0 22.6 Mbit/s 10
Long range	0 10.4 Mbit/s 10
✓	Cheap; fast.
✗	No support for changing or upgrading antennae.
Verdict	●●●●○

Apple AirPort Extreme

Apple's flair for design is clearly written all over the AirPort Extreme and it offers a range of services for communications — a built-in v.90 modem, a USB port for printer sharing, an external antenna connector (it lacks an internal antenna) and a LAN-bound Ethernet port/Internet-bound Ethernet port, depending on how your network is set up.

Configuration of the unit is accomplished with the bundled software, and a beta version for Windows 2000 and XP users is available from Apple's Web site. To configure the unit, users are required to change the appropriate files on the AirPort directly through the software utility. Alternatively, users can create a configuration file for upload. Its setup isn't as simple as some of the other units tested, but it shouldn't be too difficult for those with a little networking experience.

It's also quite adept when it comes to security, with support for WEP, WPA and RADIUS authentication, as well as MAC address-based filtering.

The AirPort's strength lies in its adaptability. The unit can act as a router for sharing Internet connections, or as a dialup server in its own right to let users access files from network shares.



Details

Contact	Apple
Phone	13 36 22
Online	www.apple.com.au
Price	\$499
Close range	0 20 Mbit/s 10
Long range	0 11.7 Mbit/s 10
✓	Built-in modem.
✗	Expensive; setup not beginner-friendly.
Verdict	●●●●○

Belkin 802.11g Wireless Network Access Point 7130

Belkin's 802.11g Wireless Network Access Point 7130 has a few things going for it, but performance isn't one of them. Results in the close- and medium-range tests are acceptable, but at long distances it's another story. In fact, results couldn't be tabulated at this mark because a connection couldn't be held for long enough to complete the test.

This unit also has a strange design flaw; when the unit is wall-mounted, the activity lights point at the ceiling.

On a more positive note, the Belkin's software maintenance screens have a variety of handy features. These include the ability to save a configuration for backup, automatic firmware upgrading, and the ability to turn off SSID broadcasting for additional security. Standard 64- and 128-bit WEP encryption is also included, as is compatibility with 802.11g and b networks.

Setup of the Belkin 7130 is quick and easy thanks to yet another

Web-based front end. First-time users are also well catered for, with the inclusion of a comprehensive manual.



Details

Contact	Belkin
Phone	(02) 4372 8600
Online	www.belkin.com/auz
Price	\$259.95
Close range	0 16.1 Mbit/s 10
Long range	0 N/A 10
✓	Easy setup.
✗	Drops out over long distances.
Verdict	●●○○○

D-Link AirPlus Xtreme G DWL-2000AP

The D-Link 2000AP is targeted towards the small office or home user, offering only basic 128-bit WEP encryption. It has an average performance, clocking in with mediocre 15.2Mbit/s transfers at the medium range. However, the DWL-2000's long distance throughput is outstanding, running second only to the Level One access point.

Performance notwithstanding, a couple of standout features set the D-Link apart from the majority of the competition. It offers the 108Mbit/s dual transmitter speed, wireless bridging between two or more wireless networks and the ability to act as a wireless card for connecting a client PC to an existing wireless network.

The unit's setup is performed via a HTML-based wizard interface, simplifying initial configuration for less experienced users.

The DWL-2000AP also includes several replacement antennae for extending power and range.

This model wouldn't function in 108Mbit/s mode with our Netgear

511T PC card, reinforcing the notion that wireless (and Cat 6) networks work best with equipment provided by the same vendor.



Details

Contact	D-Link
Phone	1300 766 868
Online	www.dlink.com.au
Price	\$303.60
Close range	0 26.3 Mbit/s 10
Long range	0 13.6 Mbit/s 10
✓	Consistent throughput.
✗	Basic features.
Verdict	●●●○○

HP ProCurve Wireless Access Point 420

Aimed squarely at corporate users, the ProCurve Wireless Access Point 420 promises many head-scratching moments for the uninitiated. Users should avoid jumping right into the Web-based configuration menus as the unit's wireless radio cannot be enabled. The unit's country code needs to be configured via the telnet or RS-232 console text-based configuration to ensure it operates within a country's wireless specifications.

The 420 performs well in testing, consistently scoring average or above average. A range of security and network management protocols are supported — the ProCurve is one of the few units tested using WPA standards, as well as WEP, RADIUS (802.1x authentication) and MAC filtering.

The purely functional design is let down by one oversight: when mounted, the ports point upwards. This constitutes a potential nightmare when technicians need access to the unit's console port and it's clogged up with dust.

As with the 3Com Wireless LAN Access Point 8250, this unit also supports Power over Ethernet.



Details

Contact	Hewlett-Packard
Phone	13 23 47
Online	www.hp.com.au
Price	\$628.10
Close range	0 20.7 Mbit/s 10
Long range	0 10.1 Mbit/s 10
✓	Excellent security; Power over Ethernet.
✗	Expensive; difficult setup.
Verdict	●●●○○

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www.wadata.com.au

Netcomm NP5400

The Netcomm NP5400 is easily the weakest performer in this roundup. With a highest average throughput of 13.6Mbit/s, even at very close range, this unit scores consistently lower than the others on test.

The NetComm doesn't offer any notable features to make it stand out — 802.11g and b support, WEP at a maximum of 128-bit and a single external antenna are standard fare. On the positive side, Netcomm provides a clear and comprehensive manual that covers everything from basic security to planning a wireless network.

A custom Wireless Navigator software program provides access to the unit's Web-based setup utility. Like 3Com's Wireless Infrastructure Device Manager, this can be used to maintain a number of access points on a network, making the task easier than juggling a list of IPs and passwords.

Conveniently, a crossover/straight-through switch is on the back

of the unit for connecting it directly to a PC for simple file-sharing. This is a very handy add-on, as anyone who's ever had to dig through boxes of Ethernet cables looking for a crossover can attest.



Details

Contact	Netcomm
Phone	(02) 9424 2000
Online	www.netcomm.com.au
Price	\$319
Close range	0 13.6 Mbit/s 30
Long range	0 3.5 Mbit/s 30
✓	Good manual.
✗	Expensive; slow.
Verdict	●●○○○

Netgear ProSafe WG302

The use of "safe" in this unit's name is no exaggeration. Along with support for WPA, WEP at 152-bit and RADIUS authentication, it also features SSL encryption for Web-based management and peer-to-peer blocking for stopping transfers between wireless clients.

The ProSafe WG302 is an enterprise-level offering, but doesn't bring anything new to the table. As with the Netgear WGT602 (below), the unit delivers a fairly average performance, scoring well over short and medium distances, but dropping off significantly in the long-distance test.

Setup and configuration are simple and straightforward through a Web-based front end, with no surprises in store for new or inexperienced wireless administrators.

As a small office/home office access point, the WG302 functions quite well, but offers no real advantages over the WGT602 to casual users apart from WPA encryption.

As a high-level solution, the ProSafe WG302 fares reasonably well

against its enterprise-based brethren, but may not be the answer for users who need something that can go the distance.



Details

Contact	Netgear
Phone	1800 502 061
Online	www.netgear.com.au
Price	\$549
Close range	0 20.4 Mbit/s 30
Long range	0 3.6 Mbit/s 30
✓	Easy setup; Power over Ethernet; good security.
✗	Poor long-distance results; expensive.
Verdict	●●●○○

Netgear WGT602 108Mbit

The modestly-priced WGT602 is a straightforward 802.11g wireless access point with 802.11b backwards compatibility. However, it supports theoretical transfers up to 108Mbit/s by running two separate 802.11g transmitters and combining their bandwidth for the extra boost.

However, the unit's actual throughput maxes out at 20.5Mbit/s at a range of less than 30cm. At the medium range, the WGT602 manages a respectable 15.5Mbit/s. Performance drops remarkably with long distances, only achieving around 2Mbit/s when testing from one floor directly beneath the unit.

Setup of the WGT602 is simple, with an HTML-based interface, using wizards for wireless, network and ADSL dialup settings. Supporting 64- and 128-bit WEP, the option is disabled by default, leaving a wide hole in the network until it's correctly set up — a common pitfall for less savvy users.

Only Netgear wireless cards are compatible with the faster 108Mbit/s

mode, reinforcing the need to maintain a "channel solution" — only using products from the same vendor when building a network.



Details

Contact	Netgear
Phone	1800 502 061
Online	www.netgear.com.au
Price	\$199
Close range	0 20.4 Mbit/s 30
Long range	0 2 Mbit/s 30
✓	Easy setup.
✗	Poor long distance results.
Verdict	●●●○○

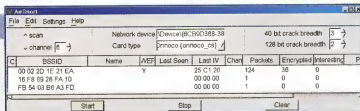
Wireless security

Security for wireless networks is perhaps even more important than the wired equivalent, as curious browsers or malignant hackers no longer need to gain access to your premises or to enter via a usually well-protected Internet link. Most network users have figured out the benefits of using a firewall and software that restricts access to protect their network, but too many people seem to ignore the obvious risks associated with network hardware that actively transmits your data over a wide area.

The standards in protecting your wireless networks are weak at best. Wired Equivalent Privacy (WEP) will stop the casual snoops happening upon your network, but as with all static and broadcasted keys, it's open to attack. By using a program such as AirSnort (<http://airsnort.shmoo.com>) it's possible to crack WEP keys.

AirSnort is a passive system that monitors all passing wireless network traffic. It can successfully guess a WEP key after snooping on between 100MB and 1GB of network traffic. This obviously takes some time, but if someone is determined to crack a WEP key, they will wait.

Wi-Fi Protected Access (WPA) takes security to the next step, periodically creating new keys and broadcasting them to all clients on the network who were using the key before. Theoretically, if someone can crack a key fast enough, they can put themselves in the loop to receive a new key. However, the speed at which WPA changes keys on the potential intruder makes this unlikely, though not impossible. The downside of WPA is the lack of support in



► **Crack tools:** wireless networks must guard against tools like AirSnort.

many of today's operating systems. Windows XP has a WPA client, but the Windows 2000 and 9x series lack support and vendors are typically slow to provide WPA clients for older systems or alternative operating systems. Only a few of the units in this roundup offer WPA support.

The most effective way to provide security on a wireless network is to configure the access point to only accept connections from clients with pre-defined MAC addresses. The significant disadvantage to this method is that all equipment to be used on the network needs to be identified by the administrator, and the MAC address needs to be manually entered into the WAP. Not all units support this effective, albeit tedious, lockout-style of protection.

Windows XP SP2 is set to add to Windows' built-in handling of wireless security by simplifying the interface and automating secure connections with trusted networks. A list of articles on Wi-Fi security can be found at www.practicallynetworked.com/tools/wireless_articles_security.htm. APC strongly suggests that you read it before going wireless.

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Go commando

There's never been a better time to equip your duffel bag for mobile deployment.

Wireless networking is driving uptake like never before and the range of devices on the Aussie market is extremely diverse. Be it working away from your desk, surfing the Net from your couch, or responding to work emails while you skive off at the beach, there's a mobile device to suit all applications.

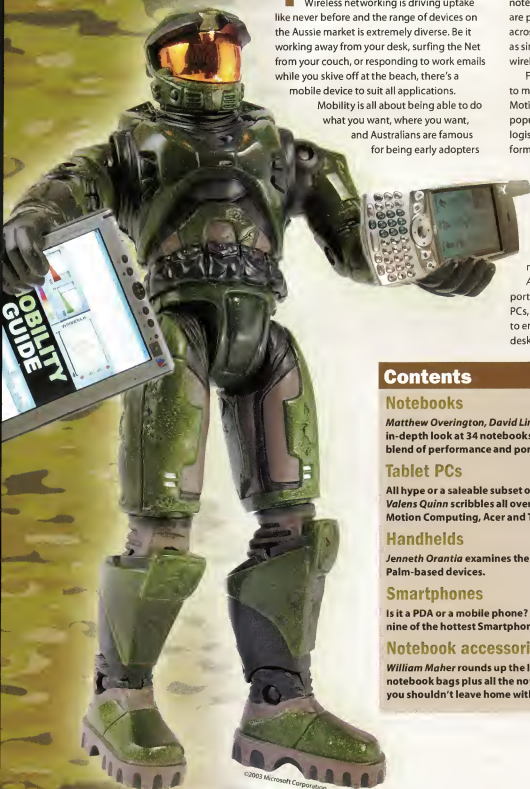
Mobility is all about being able to do what you want, where you want, and Australians are famous for being early adopters

of new technology and trends. This is reflected in our national obsession with mobile phones, notebooks and PDAs. Wireless access points are popping up in airports, hotels and cafés across the country, and getting online is often as simple as sitting down, buying a block of wireless access time and logging on.

First-generation Tablet PCs have given way to more refined models from Toshiba, Acer, Motion and Fujitsu. While they haven't been as popular among home users, the medical and logistics industries have embraced the slate form factor, while convertible designs mean that buyers get the best of both worlds: notebook functionality with a pen interface.

The emerging range of Smartphones blends PDA functions such as contact management, email, scheduling and basic Web browsing with a regular mobile phone.

APC has rounded up a collection of portable devices including notebooks, Tablet PCs, handhelds, Smartphones and accessories to enable you to mobilise away from the desk or office.



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Contents

Notebooks	78
<i>Matthew Overington, David Lin and Jarrod Spiga take an in-depth look at 34 notebooks in a search for the ultimate blend of performance and portability.</i>	
Tablet PCs	100
<i>All hype or a saleable subset of portable PCs? Valens Quinn scribbles all over Tablet PCs from Fujitsu, Motion Computing, Acer and Toshiba.</i>	
Handhelds	102
<i>Jenneth Orantia examines the latest Pocket PC and Palm-based devices.</i>	
Smartphones	108
<i>Is it a PDA or a mobile phone? Anthony Caruana reviews nine of the hottest Smartphones on the market.</i>	
Notebook accessories	114
<i>William Maher rounds up the latest and greatest notebook bags plus all the notebook essentials you shouldn't leave home without.</i>	

Notebooks

**Matthew Overington, David Lin and Jarrod Spiga
put 34 notebooks to the test in order to separate
the stellar from the stinkers.**

There has never been a better time to snap up a notebook. Aggressive price wars, strong sector growth and exciting breakthroughs in technology have all helped make 2004 the year of the portable. In the past, notebooks offered a stripped-down spec compared with desktop machines. These days, dedicated notebook hardware has added features to portables.

There's a saying when it comes to selecting a notebook: "Performance, price, portability — pick any two." In other words, it's possible to purchase an inexpensive machine that's portable, but it will probably be slow. Likewise, a cheap, fast machine will contain many desktop components and won't be easy to transport. And by extension, a thin and light unit with stellar benchmarking results won't be cheap.

TAKEAWAY TECHNOLOGY

Intel's Centrino combination of chipset, Pentium M processor and Intel Pro Wireless adaptor has set new standards for performance and portability. It also proves that fast notebooks can consume very little power. AMD's Athlon XP-M-based machines generally don't fall too far behind — for now. Upcoming Intel Dothan processors are set to draw a little more power than current Banias-based Pentium Ms, but have expanded cache and will hit 2GHz.

But it's not all about x86-based notebooks: Apple's range of PowerBooks is impossible to ignore. These well-engineered PCs offer backlit keyboards, FireWire 800 support, and a quality OS that supports Windows networking. The availability of cross-platform software, such as Microsoft Office, makes Apple's notebooks worthy alternatives for any desktop owner — PC or otherwise.

The machines on offer today are capable of running current software packages — even massive applications such as Visual Studio .NET. This makes notebooks extremely appealing for households with one or more computers. An increasing number of existing computer owners are opting to purchase portables instead of upgrading a desktop machine.

FEATURES AND FUNCTION

When considering the purchase of a notebook, ask yourself what you will be using it for. If you spend a lot of time on the move, a thin, light unit with plenty of battery life is probably the best option. APC strongly recommends that you hunt down the smallest unit that still packs in all the features you need. Aim for less than 2.5kg if you're going to be moving it around regularly, and under 2kg if you spend more time on the road than at your desk. Features such as optical drives will likely be sacrificed if you opt for a machine with a smaller form factor.

If you're an engineer or architect, screen real estate and raw benchmark performance are more decisive factors than portability. Speed and connectivity become king, and many top units now ship with Gigabit Ethernet and a bevy of USB and FireWire ports.

One of the biggest drivers for the uptake of Centrino technology is built-in wireless networking. Many hotels, airports and cafés now offer inexpensive public wireless access to customers.

The majority of the notebooks in this roundup are Intel-based, and very few vendors were willing to supply Athlon XP-M units for review. Despite the fact that APC specifically invited AMD-based machines to the roundup, only ASUS and Acer were willing to employ AMD's flagship 32-bit mobile processor. AMD is surging ahead with 64-bit desktop machines and low-cost Opteron servers, so it company can afford to concede a little ground to Intel for the moment.

How we tested

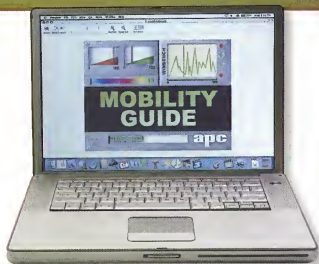
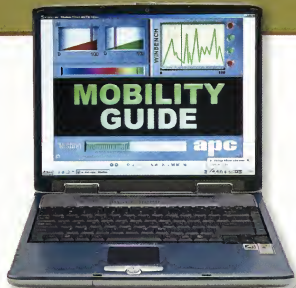
The first test performed on every notebook was MobileMark 2002. The main purpose of this test is to determine battery life, but we also get a performance and response rating for each subject.

The Business Winstone 2002 and Multimedia Content Creation Winstone 2003 benchmarks have served us well for many months now, but the applications within these benchmarks are becoming dated. So, fresh into the Lab come Business Winstone 2004 and Multimedia Content Creation Winstone 2004 — essentially the same benchmarking suites but with more up-to-date applications. Unfortunately, the results of the latter

benchmarks aren't comparable to the former suites', so we've included both sets of numbers for you to draw your own conclusions.

And because there's nothing like playing a game or two to unwind and release the stress after work, all systems were run through 3DMark2001 and 3DMark2003 (if they were capable of running it).

The easiest way to test a notebook's functionality is to sit down and use it for a couple of hours. In order to do this, many of the reviews were written on the notebooks themselves, while the rest were used in and around APC's office over a period of three weeks.



Protac Excel G551

Simply put, this powerbook has everything you need without the fluff. It's built around a top-spec Pentium M 1.7GHz processor and comes with one stick of 256MB, PC2100 DDR SDRAM. This

combination in the engine room sees the Excel G551 blitz the competition in almost all application benchmarks, including a MobileMark 2002 score that cracks the 200-point barrier.

Similar results were obtained from our

Winstone benchmarks. A score of 40.1 under MCC

Winstone 2003 is good for a desktop system, let alone a notebook. Under the more recent Content Creation variant, the G551's 21.4 is the highest score achieved by any system in this test.

On the gaming front, the ATI Mobility Radeon 9000 GPU performs admirably: scores of 5,549 under 3DMark2001 and 803 under 3DMark2003 are high enough to satisfy most needs.

The battery gives three hours and 53 minutes of power between charges, which could be increased with more power-efficient settings. The enclosure, by Taiwan's Elitetgroup Computer Systems, is simple in design, if a little on the weighty side. There are no buttons or ports in awkward locations, the keyboard is intuitive, and the two speaker grilles ingeniously double as cooling vents. Two hotkeys are also included for one-touch access to Web browsers and mail clients.

On the communications front, a Realtek RTL8139 Fast Ethernet port and Actiontec MDC modem complement the Intel PRO/Wireless LAN 2100 802.11b Wi-Fi adaptor. Unfortunately, while many other contenders ship with a DVD-RW drive, Protac has supplied us with a DVD/CD-RW combo drive. A legacy parallel port is present on the back, along with D-sub, TV-out, two USB ports and an infra-red port for the mobile Internet user.

For further expansion, a PC Card slot sits next to the 4-pin FireWire port on the left-hand side.

In terms of value for money, it's impossible to go past the Excel G551 package. While there are more feature-rich notebooks available, none are capable of taking the G551's performance crown.

Details

Contact	Protac
Phone	(02) 8748 8888
Online	www.protac.com.au
Price	\$2,899
✓	Blistering performance; battery life.
✗	Weight.
Verdict	★★★★

Apple PowerBook G4

Although it's fitted with neither an AMD Athlon XP-M nor an Intel Pentium M processor, Apple's 15in PowerBook has comparable features to most of the x86-based machines in this roundup. The

PowerBook's list of specs is impressive, and the performance matches expectations.

The 17in PowerBook is Apple's flagship model, but the company has worked hard to pack all the bells and whistles of its big brother into the 15in unit: Bluetooth, AirPort Extreme, USB 2.0, FireWire 400/800 and Gigabit Ethernet support, S-Video output and a SuperDrive are all present.

Our review unit shipped with a 1.25GHz processor, 512MB of RAM, an 80GB ATA100 hard disk and Mac OS X v10.3 (Panther). It rockets to 160 under SpeedMark 3.2: an impressive score, especially when you consider the 1.33GHz 17in unit clocks in at between 161 and 165. Unfortunately, results under Quake III tests are less impressive: the unit only managed 88.6fps at 1,024 x 768 pixels. The machine is responsive and stable during operation, and a pleasure to use for just about any office task. DVD playback is also faultless, thanks to the PowerBook's 1,280 x 854 wide-screen display.

Apple has changed the chassis from titanium to brushed aluminium and the new finish is soft, prone to scratches and quickly appears tatty. Two sensors in the speaker panels detect ambient light and automatically adjust screen brightness, turning on the keyboard backlight as soon as the light level drops.

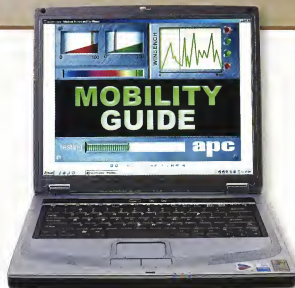
The main problem with the PowerBook is the heat it generates. The underside of the machine becomes quite hot during operation and the aluminium finish

conducts this heat straight to its users' lap. The warranty also disappoints — it costs an additional \$598 to extend the one-year warranty by two years.

However, the 15in PowerBook is still one of the most desirable mid-range notebooks on the market. Unfortunately, you'll need a champagne budget to afford one.

Details

Contact	Apple Australia
Phone	13 36 22
Online	www.apple.com.au
Price	\$4,799
✓	Slick, well-built machine.
✗	Chassis heats up during operation.
Verdict	★★★★



FOSA CL50

FOSA's entry in this roundup is very interesting. The chassis is identical to Digital Star's submission and is manufactured by the Taiwanese company Compal Electronics. As there isn't much that an OEM can do to jazz up the look of a notebook chassis, the feel is akin to a beige-box desktop. And like many no-brand desktops, FOSA's notebook proves to be a "sleeper".

The FOSA achieves a mammoth rating of 18B under MobileMark 2002. Primarily responsible for this score is the 512MB of PC2700 DDR RAM. The higher clock rate, combined with the total memory capacity, gives an extra boost to multimedia applications in particular. Business application performance is also very good, thanks to the Pentium M 1.6GHz processor. Results of 28.8 and 16.9 are obtained from Business Winstone 2002 and 2004 respectively. A battery life of three hours and 57 minutes adds to the impressive package.

For the third gaming application the CL50 scores 7,401 in 3DMark2001 thanks to its ATI Mobility Radeon 9000 GPU fed with 64MB of VRAM. While reasonable by laptop standards, 3DMark2003 won't run, preventing gameplay with DirectX 9 features enabled. It's a shame, since the 15in 1,400 x 1,050 LCD is a dream to look at, with minimal ghosting during even the fastest of action sequences. You can also be assured of a relatively fault-free screen due to FOSA's two dead pixel policy, one of the best in this roundup.

The location of the DVD/CD-RW combo drive is disappointing. It opens towards you, so you have to tilt the notebook to a different angle to access your optical media. Otherwise peripheral support is fantastic. There are three USB ports (the one on the left is ideal for a USB key) along with D-sub, S-Video, 4-pin FireWire and infra-red ports and single PCMCIA and SD card slots. Legacy support is present with the inclusion of a parallel port.

Rounding out the package is the budget-friendly \$2,399 price tag and a one-year warranty. A three-year support option is also available.

Details

Contact	Com-tek Australia
Phone	(03) 9329 2388
Online	www.com-tek.com.au
Price	\$2,399

✓	All-round performance; price; dead pixel policy.
✗	DVD/CD-RW drive location.
Verdict	●●●●○

IBM ThinkPad T41

IBM's ThinkPad T41 has made a couple of improvements in the performance stakes over its critically acclaimed predecessor, the T40.

IBMs are renowned for being "the engineer's notebook" due to their rock-solid build, and the T41 is no different. This ThinkPad also ships with IBM's "Airbag" technology. By using motion sensors, software can determine whether the notebook has been jolted. When the jolt exceeds user-defined parameters, the hard disk is temporarily stopped to prevent damage. Drive shock absorbers further protect the physical disks and heads.

The keyboard is well designed, and includes forward and back buttons near the arrow keys, making Web browsing a breeze. There's support for legacy printers via a parallel port, while two PC Card slots and two USB ports handle other peripherals. As with other IBM designs, don't bother looking for the Windows or right-click keys on the keyboard. Serial and FireWire functionality are also missing.

As the ThinkPad is branded with a Centrino sticker, you know that an Intel PRO/Wireless B02.11b network adaptor is included. Those wanting the fastest wired network access will be pleased to note that the Ethernet port on the side is capable of Gigabit connections and the built-in modem is V.92 certified.

The Intel Pentium M running at 1.6GHz provides consistent and solid Winstone results. Scores just shy of 20 for both 2004 suites put the T41 at the pointy end of the field when using the latest apps. The 512MB of RAM certainly contributes to this result. Surprisingly, MobileMark measures a mediocre performance rating of a just 10.5. However, the battery lasts four hours and seven minutes.

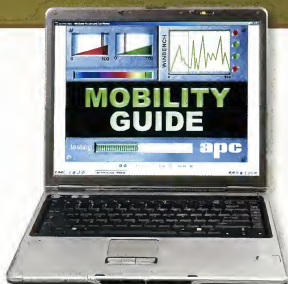
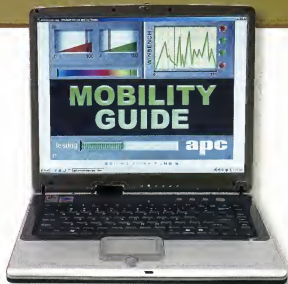
There's enough here for entertainment too. Given that an ATI Mobility Radeon 7500 GPU powers the display, you'd be forgiven for assuming abysmal 3D performance. However a solid score of 4,004 under 3DMark2001 produces decent gaming frame rates.

At just under \$3,700, the T41 a little on the expensive side. Offsetting this is a solid three-year warranty and the inclusion of a stack of software.

Details

Contact	IBM
Phone	1800 289 426
Online	www.ibm.com.au
Price	\$3,699

✓	Airbag technology; Gigabit Ethernet.
✗	No FireWire.
Verdict	●●●●○



IPEX Companion 51A

Another of the standout performers, IPEX's Companion 51A also has the advantage of being highly configurable. This unit costs a tiny \$2,668 and includes an Intel Pentium M running at 1.6GHz, though this can be boosted to the 1.7GHz variant.

IPEX specifically targets its machines at the business market, so it's not surprising there isn't a lot here for gamers. The Intel i855GM graphics chipset consumes up to 64MB of system memory in order to display images on the 15in, 1,024 x 768 screen, and produces a 3DMark2001 score of just 1,866. It struggled to complete the first test of 3DMark2003, so don't expect it to run DirectX 9 applications well.

This notebook's strength lies in its power: the combination of its 1.6GHz CPU and twin 256MB DDR SDRAM DIMMs. The MobileMark score of 184 is stellar, and the unit will run for four hours and 49 minutes away from the mains. The other test results are equally impressive, with Business Winstone 2002 scoring 29, MCC Winstone 2003 attaining a slick 38.2, and both 2004 benchmarks returning consistent scores around the 20-point mark.

The Companion 51A has a Fast Ethernet port and a V.92-compliant modem for dialup Internet connectivity. However, Bluetooth and IR interfaces are absent, meaning that mobile Internet users will have to rely on a serial or USB data kit solution to go online via mobile phone. A legacy parallel and serial port is generously supplied, along with one FireWire and three USB sockets. Unusually, the two PC Card slots are next to each other instead of sitting one on top of the other. D-sub and PS/2 ports are located on the back of the unit.

The chassis itself is sturdy and the keyboard is sound. Two programmable quick-launch buttons are included and Wi-Fi connectivity can be switched on or off with the press of a button.

Our review machine came with a DVD/CD-RW combo drive, but a DVD-RW drive can be installed on request. Windows XP Professional comes as standard, but you can downgrade to Windows 2000 or XP Home.

Details

Contact	IPEX
Phone	1800 222 479
Online	www.ipe.com.au
Price	\$2,668

✓	Productivity results; configuration flexibility; legacy support.
✗	Gaming performance.

Verdict ●●●●○

LG LM50-34GA

As a relative newcomer to the notebook market, LG's LM50-34GA is a pleasant surprise. The company doesn't have many models in its range, but all are a delight to use and this one stands out for performance. The Intel Pentium M 1.6GHz CPU and twin 256MB PC2700 DDR RAM modules provide a solid foundation. Multimedia content applications really benefit from the higher-clocked memory — the MCC Winstone results are the highlight, reaching 36.6 for the 2003 flavour, and 18.8 for this year's version.

It's a bit hard to draw a conclusion about gaming performance. The ATI Mobility Radeon 9600 boasts excellent gaming frame rates, with scores of 8,648 and 2,340 measured under 3DMark2001 and 2003 respectively. The high-res 1,400 x 1,050 screen is easy on the eyes and offers a sharp 2D image. However, LG has had to sacrifice the refresh rate to achieve this quality. The result is ghosting during action games. Of course, this can be overcome by plugging the system into a TV or monitor via the S-Video or D-sub plugs, but that doesn't give a truly mobile gaming solution.

One of the factors that makes the LM50 so easy and pleasurable to use is the full-sized keyboard. The layout and size of the keys are among the best we've seen, though some of the additional function keys sported by other models in this roundup are missing — only basic volume controls are present.

Three USB ports are included, along with single FireWire, parallel and PC Card slots. Users of SecureDigital flash cards will also be delighted to see the inclusion of a reader.

Standard networking features are available, including the prerequisite Intel 802.11b adaptor for the Centrino moniker, 3Com Fast Ethernet port and 56Kb/s modem. An infra-red port is also located on the front of the unit.

Other small disappointments include the LM50's lack of stamina and the price. After forking out \$4,000, users should be able to work away from mains power for longer than two hours and 10 minutes.

Details

Contact	LG Electronics
Phone	1800 725 375
Online	www.lge.com.au
Price	\$3,999

✓	Multimedia and gaming performance; keyboard.
✗	Display refresh rate; battery life.

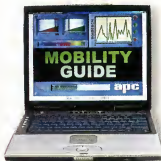
Verdict ●●●●○

AOpen Openbook 1557

The two notebooks in this roundup from AOpen look like two peas in a pod. This is the higher-specced 1557 model has a 1.7GHz Pentium M with 512MB of PC2700 RAM and a Mobility Radeon 9600

graphics adaptor. Despite its plain appearance, it comes with most appointments expected of a high-end model, including a massive 80GB hard disk, DVD+RW optical drive, modem, Ethernet, IR, FireWire, S-Video, VGA, PC Card slot, three USB ports and flash card reader, plus audio support for SPDIF input and output.

The 15in LCD pumps out up to 1,400 x 1,050 pixels natively and will crank up to 2,048 x 1,536 pixels in a virtual display or through a capable monitor plugged into the VGA port. Not surprisingly, it rates highly in graphics performance, recording 9,401 in 3DMark2001, missing out on the top spot by a mere two points. It falls back when running the 3D Winstone tests, but has an excellent battery rundown of four hours and 51 minutes.



Details

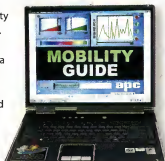
Contact	Bluechip infotech
Phone	1800 803 802
Online	www.bluechipit.com.au
Price	\$3,199
✓	Excellent battery.
✗	Poor 2D performance.
Verdict	●●●○

ASUS A2500D

This is one of a handful of Athlon XP-M machines submitted, and judging by the results, we see why Athlon XP-M-based notebooks are thin on the ground.

Compared to the Centrino notebooks, the A2500D is a hefty unit, tipping the scales at 3.3kg. Apart from the Athlon XP-M 2600+ processor, the ASUS has a 15in display powered by an ATI Mobility Radeon 9600, 512MB of PC2700 memory, a 60GB hard disk and a DVD-RW drive. Five USB ports are dotted around the chassis; FireWire, parallel, PC Card slot, S-Video, Ethernet and modem ports are built in; and the front edge has a flash card reader and a number of hi-fi controls. The only obvious omission is wireless networking.

The 2D benchmark results are disappointing, though the gaming frame rates are acceptable. Battery life is a mere two hours and 26 minutes.



Details

Contact	Cassa
Phone	(07) 3853 5444
Online	www.cassa.com.au
Price	\$2,349
✓	Good graphics.
✗	Heavy.
Verdict	●●●○

ASUS M6B00N

ASUS has made its name by offering machines with good features at reasonable prices. The \$2,999 M6B00N is a good example: 15.4in wide-screen driven by a Mobility Radeon 9600 graphics adaptor, 1.5GHz Pentium M, 256MB RAM, 60GB hard disk and DVD-ROM /CD-RW combo drive. There's also FireWire and flash card reader, parallel port, hi-fi controls, four USB ports, S-Video, VGA and PC Card slots. The wide-aspect display makes it one of the larger notebooks in this roundup.

The M6B00N's 2D benchmark performance is good in MobileMark and Business Winstone 2004, and the ATI Radeon 9600 positively shines in 3DMark2001 and 3DMark2003. Battery life is also impressive, taking three hours and 57 minutes to run down on normal settings. Viewing DVDs on the big 15.4in screen is sensational (14.1in or 15.1in models are also available) and the sound quality is above average for a notebook.



Details

Contact	Cassa
Phone	(07) 3853 5444
Online	www.cassa.com.au
Price	\$2,999
✓	Wide-aspect screen.
✗	Bulky.
Verdict	●●●○

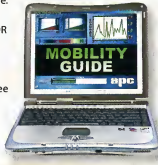
BenQ Joybook 5000-V022

This is BenQ's successor to the 5000-V02 model, the difference being an upgrade to the ATI Mobility Radeon 9000. The Joybook's designers have also improved its styling, with curved edges and a soft silver and blue colour scheme.

The machine boasts a 1.5GHz Pentium M, 256MB of PC2100 DDR RAM, ATI Mobility Radeon 9000 graphics adaptor driving a 14.1in LCD, 40GB hard disk and combo DVD-ROM/CD-RW. There are three USB ports, an SD card reader two Type II PC Card slots, S-Video, VGA and FireWire ports, as well as communications ports.

The specs look competent but tests show it's an underachiever, with the worst Business Winstone 2004 score backed up by poor MobileMark results. Thankfully the Mobility Radeon 9000 makes the 3D tests more creditable, and battery life is a whopping six hours.

This unit's poor office productivity results mean this isn't a notebook for the boardroom.



Details

Contact	BenQ
Phone	1300 130 336
Online	www.benq.com.au
Price	\$2,349
✓	Battery that just refuses to die.
✗	Poor office productivity performance.
Verdict	●●●○

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+++++

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Power management tips

To make a computer mobile, you need a portable power source. And the greater the independence of the computer from external power sources, the greater the mobility. Every mobile computer requires some "roosting" time for the power source to recharge, unless someone has invented a nuclear-powered notebook without our knowledge.

Notebook makers have long wrestled with the predicament of providing a portable power source without rendering the notebook too heavy, and solutions have ranged from spare batteries to hardware and software devices. Over the years, hard-core users have refined techniques, tips and tricks to extract extra computing time away from the mains. Anyone looking to improve their notebook's battery life is advised not only to read this, but also to seek an experienced user's advice.

POWER BOOST

Thankfully, battery technology has also improved significantly since the early days, the most irksome complaint being the one that is mostly eliminated — Nickel-cadmium (NiCad) batteries. They have a dreadful memory effect, but unless you have a very old portable computer it's unlikely you'll ever experience it. Modern battery technologies like Li-ion or NiMH can suffer from the same malady, but not to the extent that NiCads do.

Basically, battery cell memory effect occurs when a user constantly charges their battery after small power drains. The battery develops a "memory" and only recharges to the previous drained level. Within months, the battery is effectively useless and needs replacement.

Most tips and tricks for prolonging battery life depend on the way you use your notebook when it's untethered. While those with a technical bent can have a look at BIOS options, most users make do with the tools the operating system provides. Succeeding generations of Windows have improved their power management capabilities to gain extra battery life.

Between 30-40% of a notebook's power consumption is related to the display, regardless of whether it's using a mobile or desktop CPU. Windows XP's (Home or Professional) Power Options applet has a number of power conservation schemes. These include options to turn off the monitor or hard disk after a certain period of inactivity (ranging from one minute to five hours) and to send the system into "suspend" or "hibernate" mode. Separate tabs control the critical alarms, hibernation and system tray indicator.

In addition, users can make some adjustments that will lighten the load. If you're not looking to connect externally, disable the Ethernet, WLAN, infra-red and Bluetooth adaptors. Look in the system tray and see if there are any background applications chewing up CPU cycles and eliminate any that are non-essential.

LIGHTEN THE LOAD

Third party utilities that supplement or augment Windows options are becoming more common. Brand name notebooks, such as those from Toshiba and IBM, bundle additional power management software with comprehensive battery maximising profiles. The better utilities allow users to decrease screen



► **Powered by methanol:** advanced fuel cell technology may be available by the end of the year.

brightness and CPU speed at preset intervals as well as suspend and hibernate. Even if your notebook manufacturer hasn't bundled a utility program, scan the keyboard for a dimming switch or display function key that allows for adjustment of the screen's brightness.

All notebook manufacturers recommend a usage pattern to "condition" the battery. Most batteries are designed to last 18 months, but following these tips will give you the best results: the battery should be initially charged for 24 hours; avoid draining the battery slightly and then recharging; and try to drain the battery to at least 10-15% charge once a week before a full recharge.

Be aware that advanced fuel cell technology may be available later this year. Initially it will be expensive, but it's likely to revolutionise computing away from the mains. Until then, we'll have to run our notebooks with existing battery technology.

LIQUID COOLING

While powering a notebook is a key consideration for manufacturers, the biggest issue for notebook designers is heat dissipation. A number of laptop designs have used liquid cooling as a means of piping heat away from CPUs and GPUs. In 2000, Toshiba first used the technology in its ultra-portable Portégé 3440CT. While the solution managed to cool the Mobile Pentium III chip adequately, issues involving size constraints, fluid pressure, power consumption and heat dissipation have prevented the widespread adoption of liquid cooling.

Toshiba isn't alone. Last year, NEC developed a liquid cooling solution involving a piezoelectric pump. The main advantages to this design include very low power consumption, higher water pressure and minimal noise output. It's expected that this design will be used within the next year.

We didn't see any liquid cooling solutions on any of the ultra-portables in this roundup. However, because desknotes are increasingly popular with consumers, it's inevitable that more liquid-cooled laptops will be available sooner rather than later.



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HP delivers reliability, functionality and cost savings to IndoChina through colour and print management solutions



The IndoChina group offers a bevy of award-winning trendy restaurants, bars, cafes and galleries through 15 outlets in three countries – Singapore, Malaysia and Germany. Recognised for its commitment to creativity, innovation and understanding of the contemporary Asian lifestyle, IndoChina has won accolades from the media worldwide. As the group continued to expand, there was a need to look at how its imaging and printing infrastructure could be optimised to offer functionality and cost efficiencies.

Wide-Ranging Requirements

For a start, the in-house graphics department needed to produce an extensive range of marketing collateral to promote the outlets. IndoChina's newsletters, flyers, postcards, promotional items and invitation cards had to be printed in full colour in various sizes, on various paper stocks and in various configurations. As the amount of such required collateral increased, there was a pressing need to control escalating expenses by reducing the group's reliance on outsourcing printing jobs, especially those with smaller print runs.

To move the printing of the smaller-volume collateral in-house, several challenges had to be overcome. The existing imaging and printing infrastructure, based on an old inkjet printer, could not deliver the desired colour quality. An added frustration was the amount of time needed for the graphics staff to maintain and manage the equipment as the colour ink cartridges were being used up too quickly.

Seamless Integration and Implementation

"We were confident in choosing HP as the leader in colour and networked printing," explains Ion Aniszewski, IndoChina's, Chief Information Officer. After understanding IndoChina's requirements and limitations thoroughly, the HP team devised a more optimised and networked imaging and printing environment with right-sized devices to fulfil the specific needs of each site.

An HP Color LaserJet 5500dn was installed in the graphics department, which could output and collate high-quality marketing materials in vibrant colours on different media up to A3 in size. The device allowed the department to enjoy colour printing at the speed of black and white, and improve productivity by generating high volumes of marketing material.

For the Managing Director's office, the HP Officejet 9130 was put in place to deliver All-in-One functionality of faxing, digital sending, copying, scanning and printing at a low cost. The device provided reliable support for high-volume monochrome and colour printing and copying in the office. In addition, the HP Officejet 9130 provided document management capabilities that allowed IndoChina staff to scan to email, key documents for electronic filing directly from the device, and

without the need to connect the device to a computer. As a result, IndoChina staff could reduce the multiple copies that were made from poor quality fax output and save them time and money. The HP Officejet 9130 was selected as it could handle the higher volumes and more varied stationery requirements in the Managing Director's office.

Using a software tool like the HP Web Jetadmin, enabled printer problems to be addressed immediately. IndoChina was able to enjoy further peace of mind knowing that HP proactively maintains the devices and replaces used cartridges, minimising service disruptions.

All devices were connected via VPN over the Internet for remote monitoring of the fleet. Here, IndoChina recognised that HP's network drivers were reliable, well-accepted and able to integrate seamlessly with existing applications.

Unparalleled Business Benefits

While meeting the functional requirements, HP went further to offer an attractive service package to address IndoChina's desire for cost control and maintenance support.

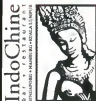
The HP Pay Per Use service package was readily accepted by Ion Aniszewski as a way to reduce upfront investments in the new infrastructure and only pay for what the group used every month. Under the package, HP also manages the entire fleet of devices, ensuring optimum performance and proactive replacement of cartridges.

"The commercial deal with HP's imaging and printing division has allowed us to deploy lower printers into every office and outlet cost effectively without the traditional capital outlay or reams of hire-purchase documentation," said Ion Aniszewski.

"The proactive monitoring by the HP service centre directly eliminates workload for our stretched IT department, allowing our staff to be productive in other areas. With HP managing our fleet, we have the assurance of reliability, efficiency and availability always," he added.

IndoChina's graphics department also benefited from a remarkable threefold improvement in productivity with the HP Color LaserJet 5500dn capable of achieving the same colour quality in-house as from an outsourced printer. Ion Aniszewski estimates that the graphics department will save about 75 per cent in printing costs by moving print jobs in-house instead of outsourcing. Within the office, the graphics staff now print their full-colour marketing collateral in one-third the time and achieve a high-quality finish not possible with their previous inkjet printer.

For more information on other stories on HP's customers, please visit www.hp.com/au/hpincolor or call 1300 305 015.



BenQ Joybook 8100

The 8100 comes with a 15.4in wide-aspect LCD, 1.6GHz Pentium M, 512MB of PC2700 memory, Mobility Radeon 9600, 60GB hard drive and DVD+RW optical drive. The standard appointments include

Ethernet and modem ports, four USB, parallel, VGA, S-Video ports and a PC Card slot. It also has some sweet features that place it inside the corporate sphere and into the emerging media centre PC class.

The screen runs at 1,280 x 800 pixels natively, an uncommon resolution, and BenQ supplies a number of software applets for the media centre functions, including its own media player. The front edge has some VCR-like controls, supplemented by a remote control which allows it to operate as a standalone media player. MobileMark and Business Winstone benchmarks are inexplicably slow, though this is to some extent compensated for by an impressive showing in 3DMark2001.



Details

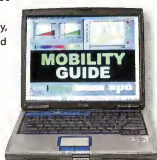
Contact	BenQ
Phone	1300 130 336
Online	www.benq.com.au
Price	\$3,399
✓	DVD burner.
✗	Sluggish 2D performance.
Verdict	●●●○

Dell Inspiron 600m

At 2.3kg and just 3.3cm thick, Dell's Centrino-class Inspiron 600m offers everything expected without the bulk of a desktop replacement. There's loads of power from the 1.7GHz Pentium M CPU and ATI Mobility Radeon 9000

graphics adaptor driving a high-resolution 14.1in TFT display, 512MB RAM, a 40GB hard disk and DVD+RW burner. Ports include parallel and serial, modem, VGA, S-Video, a PC Card slot, audio and IR ports. It also has two USB ports and a Broadcom Gigabit Ethernet adaptor, but it lacks FireWire support.

Screen clarity is striking thanks to a high resolution panel and Dell's font scaling technology. Also impressive are the strong performance benchmark results. The 600m manages very creditable ratings in MobileMark and Winstone 2004, and it scores highly enough in 3DMark2001 to give it some pretensions as a lightweight gaming machine.



Details

Contact	Dell
Phone	1300 303 107
Online	www.dell.com.au
Price	\$2,699
✓	Strong all-round performance.
✗	Only two USB ports.
Verdict	●●●○

Panasonic ToughBook CF-73

One of the most common complaints about current-generation notebooks is their fragility, and as a result there's a significant market for toughened notebooks for outdoor use. At the same time, fanless PCs designed for dirty, dusty environments have been adapted for the mobile form factor. If you find yourself travelling frequently and/or having to work in a dusty environment, a unit specially designed for the outdoors may suit your needs. Although they're more expensive than conventional units, the extra protection against knocks justifies the cost.

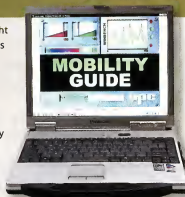
Panasonic has been developing its ToughBook line since 1998 and is recognised as the leader for consumer-level toughened portables. The emphasis here is not on the pursuit of stratospheric benchmark results, but on a robust machine that will stand up to rigorous handling. While it's not moisture- and dust-resistant like the CF-29, a low-voltage ToughBook that retails for \$6,999, the CF-73 features a spill-proof keyboard, shock-mounted hard disk and a screen with a reflective coating which effectively combats glare. Dampeners help buffer the LCD panel and there's a lack of

hard wiring anywhere inside the strong but light magnesium alloy shell. The CF-73 tips the scales at 2.2kg with power supply and also features a carry handle.

Our review unit shipped with a 1.4GHz Pentium M processor, 256MB of RAM and a 40GB hard disk. The 13.3in display runs at a native resolution of 1,024 x 768 pixels, driven by the iB55G chipset. Combo CD-RW/DVD-ROM and floppy drives round out the package.

Despite these modest specs, the ToughBook offers reasonable performance benchmarks. It manages a respectable 146 under MobileMark 2002 performance tests and two hours and 53 minutes under the battery rundown test. This is acceptable for a lightweight portable: the ToughBook is actually the third-fastest unit we tested running on a 1.4GHz Pentium M processor.

Although the ToughBook is roughly double the price of comparable units, the value of a notebook that can regularly be taken into dusty environments without having to be sent back to the manufacturer for cleaning and refurbishment speaks for itself.



Details

Contact	Panasonic Australia
Phone	13 26 00
Online	www.panasonic.com.au
Price	\$5,999
✓	Light, fast, strong.
✗	Expensive.
Verdict	●●●○

Portable media centres

With Microsoft launching its Media Center OS later this year, all eyes are on upcoming media solutions. Most notebooks have a few of the key ingredients to make a good media centre PC. TV outputs are a common feature, predominantly used to display computer-generated presentations. Of course, you may not even need one if you're lucky enough to own a digital projector or display that accepts D-sub inputs.

Once the video is sorted, you'll want top-quality audio. Stereo sound is standard these days, but compared to surround sound it could be called ultra-mono. While uncommon in notebooks, audio processors capable of putting out 5.1 channels are gaining in popularity. Of course, you could resort to utilising an external USB sound solution such as the Sound Blaster Extigy or Digital Music lines to achieve the perfect aural experience.

Why exercise your legs by getting up to freeze your favourite movie when you can use just use a remote control? Some solutions include using the IrDA interface between a PDA and notebook as a remote control, and specialised remote controls. A number of vendors are developing wireless set-top boxes that can receive streams from your system, allowing you to keep your notebook



► **Media mogul:** HP's zd7000 is the ultimate media notebook, shipping with remote control, USB personal video recorder, TV tuner, wide-screen LCD and more.

next to you while achieving the same result. And then there's the BenQ's Joybook 8100, which has its own remote.

Of course, you also need some of the obvious components. A DVD-ROM is a necessity, and the upcoming Blu-ray and HD-DVD technologies will allow you watch over two hours of high definition video from the one disc. And while we are yet to see one, a notebook with a TV tuner would provide HDTV on the go and represent a new pinnacle in portable media pads.

Dell Latitude X300

Dell's Latitude X300 is ultra-portable, but its docking station bulks it up and offers an extra battery, plus an optical drive in the form of a DVD+RW burner. However, the smaller size means compromises: a

slower 1.2GHz Pentium M, and a 12.1in LCD.

Thankfully, RAM is supplied in abundance — 640MB of DDR266. The 40GB hard disk and SD memory card slot are the only storage on the notebook proper — the DVD burner sits in the dock. All expansion ports are on the sides as the back edge is reserved for a second battery.

Despite the lightweight CPU, the X300 performs well in some performance benchmarks. Battery life isn't great at two hours and 31 minutes, but that extends dramatically with the addition of the piggyback cell and the battery in the docking station.

However, it's arguable as to how much advantage can be extracted from the dock battery as the optical drive really chews up the power.



Details

Contact	Dell
Phone	1300 303 107
Online	www.dell.com.au
Price	\$4,269 (includes the docking station), \$3,345 for PC only.

✓	Strips down to 1.3kg.
✗	Price.
Verdict	●●●○

Fujitsu LifeBook S6130

At first glance, the LifeBook S6130 is very similar to the S6120 previously reviewed (APC August 2003, page 67). However, the CPU has been decreased to a 1.4GHz Pentium M from 1.6GHz and the core logic chipset has been changed to Intel's 855GME chipset, allowing faster PC2700 memory to be used.

The other major difference is that networking has been boosted to support Gigabit Ethernet. Only 256MB RAM has been fitted and the native Intel Extreme Graphics adaptor is specced over a third-party solution.

Storage is supplied by a 40GB hard disk and DVD-ROM/CD-RW combo drive. There's also Ethernet, modem, IR, FireWire, VGA, a PC card slot and two USB ports, but no flash card readers.

Problems we experienced with the S6120 have been fixed: the S6130 is whisper quiet and the battery rundown mark of two hours and 59 minutes is a big improvement. However, 2D benchmarks are below average and results in 3DMark2001 are also ordinary.



Details

Contact	Fujitsu PC Australia
Phone	1800 288 283
Online	www.lifebook.com.au
Price	\$2,999

✓	Sub-2kg weight.
✗	Small screen.
Verdict	●●●○

Notebooks of the future

One of the major ways that notebooks will change over the next few years is in the area of security. Laptop theft costs Australian business millions of dollars every year, and that's just to replace hardware. Imagine if the CIO of a major organisation's notebook was stolen and the thief managed to access confidential information. The cost of losing this sort of data is impossible to calculate. The good news is that the industry is building hardware and writing software that will help. If your laptop is stolen, you'll be able to report the theft to a central authority, then have all the sensitive information on your hard disk instantly erased.

A blessing for educational institutions, Internet cafes and other organisations with public access computing facilities will be the advent of hardware ID tags and reporting schemes. Presently, sticks of RAM (for instance) are forever going walkabout, but if hardware identification tags were recorded on a hidden area of the hard disk, the system could identify that hardware has gone missing and alert administrative staff. Then, once that hardware is used in another system, it can report details about its location to the same staff via the Internet. It's inevitable that the same technology will be applied to notebooks and could even be used to update applications, clean viruses and perform other tasks. Then again, it could just as easily be considered another method by which malware might affect your notebook.

On the storage front, try replacing hard disks with solid-state memory. Sure, it's expensive right now, but the price is rapidly falling and this type of memory consumes less power than today's

hard disk drives. And speaking of power, even if batteries don't become more efficient, alternative technologies such as fuel cells will be able to supply all the juice you'll need to run even the most power-hungry applications.

Preliminary fuel cell designs consist of small tanks about the size of current laptop batteries. Inside the tank is an ethanol or other methyl-alcohol mixture, which is pumped and combusted within the notebook to produce the power. Each tank offers a substantial weight saving and considerably more milliamp hours than batteries, so it won't be a problem to carry a spare around when your current battery is running on empty. With enough concept refinement, we might even see refillable notebook tanks, much like the fuel tank in your car (see APC April, page 22).

As screens get bigger, they consume more and more power. If your fuel cell is already working to its full capacity, you'll be pleased to know that organic thin-film transistors are being developed by a number of companies. These new picture elements are self-illuminating and don't require a backlight, saving a considerable amount of energy and removing one of the screen's most fault-prone areas.

When the backlight is removed, the screen becomes much thinner. The next innovation on the list will be to change the material of the substrate used on the panel in order to make a screen that rolls up like a newspaper. Foldability will quickly follow, so when you put down your 14in notebook you'll be able to whip out a home cinema-sized screen.

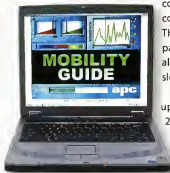
Digital Star CL50

Digital Star's CL50 comes replete with a 1.6GHz Pentium M processor, 512MB of RAM and a 1,400 x 1,050 pixel, 15in wide-screen display driven by a Mobility Radeon 9000 graphics adaptor. Storage

consists of a 60GB hard disk and a combo DVD-ROM/CD-RW drive. Three USB ports, FireWire, infra-red, parallel and S-Video out ports are all included, as is a single PC Card slot and an SD card reader.

It benchmarks well, picking up a solid 173 under MobileMark 2002's performance test and offering two hours and 58 minutes of operation under its battery benchmark. Likewise the 3DMark2001 score of 7,191 makes it a considerable performer as gaming platform.

As you may have noticed, the Digital Star CL50 is identical to the FOSA CL50. Almost. In all of our benchmarks the FOSA notebook is marginally superior, which begs the question: how did FOSA squeeze that little bit extra out of the same raw materials for \$300 less?



Details

Contact	Digital Star
Phone	1800 800 628
Online	www.digitalstar.com.au
Price	\$2,699
✓	Strong performance.
✗	Better value elsewhere.
Verdict	●●●○

IBM ThinkPad R50

The ThinkPad R50 comes as a 1.5GHz Pentium M with a Mobility Radeon 7500 graphics adaptor driving the 15in display. There is a 40GB hard disk, combo DVD-ROM/CD-RW optical drive and most of the usual connectivity options — but no Bluetooth. The R50 ships with 256MB as standard, we tested with 512MB fitted.

Besides the usual suspects, there are only two USB ports, and while there is a parallel port, there's no accompanying serial port. The hard disk has extra protection in the form of IBM's shock protection system.

MobileMark test results are only fair, but battery life is exceptional at four hours and 29 minutes. It can be extended even further with IBM's utility programs that allow fine tweaking of power management and screen brightness. Business Winstone scores well but the 3DMark2001 and 2003 results are disappointing. However, this was expected due to the older Radeon graphics.



Details

Contact	IBM
Phone	1800 289 426
Online	www.ibm.com.au
Price	\$3,149
✓	Excellent configuration options.
✗	Expensive; only two USB ports.
Verdict	●●●○



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Picture perfect

The notebooks in this roundup all use TFT active matrix LCD technology that's been popular for a decade. The newer competing technologies are plasma and passive matrix displays. Both have advantages over TFT: plasma has oversized panels that LCD just can't match efficiently, while passive matrix is cheaper to make and uses less power.

TFT, however, is not going away in the near future. What we are likely to see are different display technologies for different applications, such as the flexible display which should appear by the end of this year, or in early 2005.

Organic Light-Emitting Diode (OLED) technology, the flexible display also known as organic electro luminescence (OEL), is based on thin organic films which emit light when stimulated with an electric charge. The layers of an OLED panel typically amount to 500nm. Viewing angles can reach a maximum of 165° with an OLED panel. They have good brightness and contrast, and low power requirements mainly due to the fact they don't require back- or frontlighting.

OLED panels are as slim as a laminated print. Roll it, fold it or bend it, you can still turn it on and see an image. Commercial production is still limited at this stage, but Philips has created a new business unit called Polymer Vision, which will boost manufacturing considerably. A number of companies including Kodak and DuPont are planning to bring products to market using glass, but research is continuing



► Looking good: OLED technology is causing a bit of excitement among notebook manufacturers.

into plastic polymers which will be cheaper to manufacture and more flexible. With the move towards thinner and lighter notebooks combined with applications that have yet to see the light of day, OLED display technology paired with portables is set to be a match made in heaven.

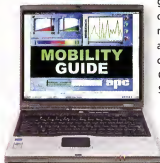
ITC Ultraport 1200

The plain silver and black chassis of the Ultraport 1200 is austere and should appeal to corporate users. It weighs a middling 2.5kg and sports a 1.5GHz Pentium M CPU, Nvidia GeForce Go FX5200

graphics adaptor driving a 14in display, 60GB hard disk and multi-format DVD burner. Optional appointments include a flash card reader, FireWire, VGA, PC Card slot, two USB, parallel and S-Video ports.

The MobileMark performance rating of 173 is identical to the Digital Star CL50 (also from the same manufacturer), and in the middle ground. The same can be said for the Business Winstone 2004 score of 16.3. Battery rundown is around two hours and 49 minutes.

We wanted to see how well the Nvidia graphics chip runs, but the Ultraport 1200 could not complete the 3DMark2001 test. Results in 3DMark2003 are disappointing, indicating that gamers should give this one a miss.



Details

Contact	IT Channel
Phone	(08) 9486 7186
Online	www.itchannel.com.au
Price	\$2,599
✓	Multi-format DVD burner.
✗	Disappointing graphics performance.
Verdict	●●●○

LG LM50-2

The LM50-2's chassis is admirably slim and sleek, at just 26.4mm thick and 2.4kg in weight. A 1.5GHz Pentium M is fitted and graphics are provided by a Mobility Radeon 9200 adaptor onto the 15in display. A 40GB hard disk, SD card reader and very slim combo DVD-ROM/CD-RW form the storage options.

It's thoroughly modern in the way the ports — S-Video, SPDIF out, Ethernet and modem, FireWire, PC Card and three USB ports — have been laid out around the edges. And the quad-band antenna on the LM50s gives exceptional wireless connectivity.

Battery life is very good, with nearly four hours' running time, but the LM50-2 struggles to make an impression in the 2D tests, with a performance rating of only 148 in MobileMark and 14.9 in Business Winstone 2004. The Radeon 9200 makes up for it somewhat in 3D testing, boosting the 3DMark2001 score to 4,918.



Details

Contact	LG Electronics
Phone	1800 725 375
Online	www.lge.com.au
Price	\$2,999
✓	Strong wireless LAN performance.
✗	Expensive.
Verdict	●●●○

NEC Versa P520

NEC's Versa P520 is a chunky, corporate-styled notebook with a 1.4GHz Pentium M, 40GB hard disk and combo DVD-ROM/CD-RW.



It's one of the few notebooks still around with two Type II PC Card slots and a floppy drive, as well as four USB ports, PS/2, serial, parallel and VGA ports. The keyboard is full-featured with a nice layout. There is also a row of programmable function keys and a prominent switch to enable or disable the wireless antenna.

The P520 is available in 15in and 14.1in versions. Our review unit manages a maximum resolution of 1,024 x 768 pixels, but users who prefer the 1.6GHz Pentium M model can increase the resolution to 1,400 x 1,050 pixels.

Given the P520's staid exterior and retro appointments, it's no surprise that the benchmark results are ordinary. Battery life, on the other hand, is excellent, taking some four hours and 26 minutes to run down.

Details

Contact NEC Computers

Phone (02) 9313 0000

Online www.nec-online.com.au

Price \$2,499

✓ Thoughtfully laid out keyboard and function keys.

✗ Bulky.

Verdict ●●●○○

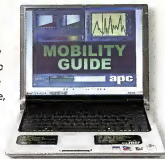
Sony VAIO PCG-Z1XGP

Sony's VAIO PCG-Z1XGP is a 2.1kg based on a Pentium M CPU running at 1.7GHz with a Mobility Radeon graphics adaptor, 60GB hard disk and DVD-RW optical drive. Strangely, Sony doesn't use one of its own multi-format drives, instead preferring a Matsushita.

The styling is distinctive, if not always ergonomic — there's no clasp on the magnesium alloy lid, which is too heavy and stiff to flick up with one hand. There are only two USB ports, plus FireWire, a Memory Stick reader, modem and audio ports on the sides, and the rear edge holds VGA and Ethernet ports.

Our benchmarks reveal the Z1 as a reasonable performer, though some power management features meant we were unable to generate a battery rundown rating. However, it appears extended battery life is one of its features.

It has a generous software bundle, but even this makes it difficult to justify the Z1's \$4,099 asking price.



Details

Contact Sony

Phone 1300 138 246

Online www.sony.com.au

Price \$4,099

✓ Stylish.

✗ Awkward clamshell lid; expensive.

Verdict ●●●○○

Sony VAIO PCG-V505MNP

The V505 brings Sony's VAIO series into the Centrino-class with its adoption of a 1.6GHz Pentium M CPU. It has 512MB of RAM, a 60GB hard drive and an ATI Mobility Radeon 9200 for plenty of graphical grunt. A slimline combo drive and Memory Stick reader complete the storage.

It's small, with a 12.1in display and distinctive wedge-shaped chassis that will appeal to the fashion-conscious user more the traditional corporate notebook user. Often a smaller form factor means compromises in features or performance but the unit lacks for little, with modem and Ethernet connectivity, a pair of USB ports, PC Card slot, and ports for FireWire and VGA. However, the keyboard is cramped.

MobileMark performance is good, while 3DMark2001 performance is reasonable, thanks mostly to the power of the Mobility Radeon 9200 adaptor.

As a final bonus, Sony has packed the hard disk with an excellent software package.



Details

Contact Sony

Phone 1300 138 246

Online www.sony.com.au

Price \$3,999

✓ Compact.

✗ Keys too close together; expensive.

Verdict ●●●○○

Upgrading

One of the potential pitfalls you need to be aware of when shopping for a notebook is their lack of upgradability. Although there are many user-serviceable parts inside most notebooks, dismantling one to get to its internal components will void many warranties.

While PC Card expansion slots enable you to add extra FireWire, USB or even SCSI ports, you're stuck with the keyboard layout, screen, processor and chipset for at least the duration of the warranty period. This means you're restricted to upgrading hard disks, batteries, optical drives and RAM modules.

The majority of consumer and corporate notebooks rely on ATA hard disks in the 2.5in form factor, which makes shopping for a replacement straightforward. Upgrading drives is usually as simple as unscrewing the cover on the bottom of a notebook, plugging in a replacement and installing a new OS upon boot. Some high-end portable workstations may run small form factor SCSI drives or even desktop ATA ones, but such machines are rare.

It's a similar story with RAM. Most modern machines — certainly all those in this roundup — rely on DDR-SDRAM Small Outline Direct Inline Memory Modules (SO DIMMs). SO DIMM chips are a small version of the RAM found in desktop computers, but with 144 pins instead of 168.

A few aftermarket batteries are available from top tier vendors such as Dell, IBM, Apple and Toshiba, but generally replacement cells must be purchased from the vendor to avoid negating a warranty. Replacement optical drives generally must be purchased from the original vendor to ensure compatibility.

Wi-Fi on the road

Everybody who's anybody in the industry has been promoting wireless, and we are getting to a stage where it's no longer difficult to get connected, regardless of where you are.

Since Intel's Centrino launch over a year ago, it seems like new Wi-Fi hotspots are appearing every day. In fact, the 2.4GHz band is becoming so congested in some locations that co-channel interference (a phenomenon occasionally experienced in mobile phone networks) is occurring.

Last year, the question was where to find these access points. Since they can often be found in cafés, restaurants, airports, train and bus passenger terminals and even McDonald's restaurants, the emphasis has shifted from finding hotspot providers to the range of services they offer to the roaming user.

It may sound strange, but a dialup (or sometimes broadband) account is becoming a requirement to access certain hotspots. Instead of having all users on a wireless node paying the operator for Internet access, some operators are choosing to offer cheaper access to customers with accounts at selected ISPs. This makes economic sense, as the ISP has another way for customers to access their services, the hotspot operator can minimise operational costs by relying on payment from the ISP instead of individual customers, and the customer has the convenience of paying for their access with their monthly Internet bill.

Let's not forget about other technologies that can be used to get online. The term "Personal Area Network" (PAN) has been

suggested to describe networks spanning distances of up to five metres, often by Bluetooth connections. With handset vendors constantly pushing Bluetooth devices and the emergence of faster data transfer rates over mobile phone networks (GPRS via either GSM or WCDMA/cdma2000 networks), the infrastructure is there to make it happen provided you have the budget for true mobile Internet.

Personal Broadband Australia has taken a similar idea when developing its recently launched I-burst service. By plugging the PC Card modem into your laptop, you can connect to the Internet at broadband speed. This technology relies on 3G spectrum being available for radio transmission.

For the covert ops user, a war drive is a great way to get Internet access. In a similar vein to the millions of PC users who don't patch their systems (leaving them open for attack), there are thousands of unsecured access points installed in homes and businesses. Finding an open access point with a fat pipe to the Net is like striking gold in your backyard.



Toshiba Portégé M100

The M100 isn't Toshiba's most compact notebook, but it still packs a punch into a stylish 13in unit. In the office, the Pentium M 1.2GHz CPU doesn't prove as slow as expected, achieving a moderate

score of 158 in MobileMark, with the battery lasting a very respectable three hours and 57 minutes. Winstone results are a little lower, but adding more RAM to the supplied 256MB will boost performance in this area.

Since the M100 is built for portable business, don't expect much in the way of gameplay — the Intel 855GM integrated graphics chipset only manages 1,792 points from 3DMark2001.

Some other compromises have been made for the sake of portability. The keyboard is cramped and many of the keys are too narrow or in awkward positions — we lost count of the times we hit the Page Up key instead of Shift. And instead of a trackpad, there's a cumbersome track stick in the middle of the keyboard.



Details

Contact	Toshiba
Phone	13 30 70
Online	www.id.toshiba.com.au
Price	\$4,180
✓	Size; battery life.
✗	Price; gaming performance; input controls.
Verdict	●●●○○

Toshiba Tecra M2

While most Tecra M2 models are Centrino-based, you can forego the Wi-Fi adaptor with this lower-specced 1.4GHz model while retaining Gigabit Ethernet, IrDA and V.92 modem ports for network connectivity. The inclusion of PC2700 DDR SDRAM makes the Tecra a good performer for multimedia content creation purposes, though the fact that only 256MB is included restricts its performance. More pleasing is the three hour and 30 minute battery life.

The 14.1in, 1,024 x 768 screen is completely free of ghosting, though the Nvidia GeForce FX Go5200 accelerator only just manages to render most modern games at acceptable frame rates. There's support for almost all of your peripherals.

While there are better buys at this price, few will include an international warranty, something only a company the size of Toshiba could offer.



Details

Contact	Toshiba
Phone	13 30 70
Online	www.id.toshiba.com.au
Price	\$2,695
✓	Battery life; Gigabit Ethernet.
✗	CPU spec; amount of RAM; graphics performance.
Verdict	●●●○○

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LifeBook P5020

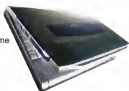
Intel® Centrino™ Mobile Technology
Microsoft® Windows® XP Professional/Home



Less than 1kg

LifeBook P1120

Microsoft® Windows® XP Professional/Home
Transmeta Crusoe TM5800 (800MHz)



Fujitsu recommends Microsoft® Windows® XP Professional for Mobile Computing.

Less than 2kg

- 13.3" XGA screen • Combo Drive DVD & CD-RW



Very Portable

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Intel® Centrino™ Mobile Technology
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Rogues gallery

When you test as many notebooks as we have, you realise that some are more at home in the dog house than on your lap.

Not all notebooks are created equal. Constructing a notebook constitutes a fine balance between spec'ing features and building a portable machine, so most notebooks are a compromise between size/weight and performance/features. Every extra feature that a vendor or OEM supplier adds to a machine has an impact on the final price and size of the unit. Most buyers have to accept some compromises: thin and light machines can suffer from cramped keyboards or flimsy construction, while powerful machines are often specced with expensive and/or weighty desktop components.

While almost every unit on the market suffers from a minor flaw of some kind, some are just poorly designed and built. It's often only in the context of a group roundup that a notebook's Achilles heel truly shows itself.

While it's difficult for APC to report on the long-term reliability issues that are so crucial for notebook owners, it pays to check out online forums for negative reports on any portable you're thinking of buying beforehand. Pay special attention to stories of battery or screen failures and issues with build quality or warranty service, as these often indicate niggling problems with a particular brand or range of notebooks.

From poor keyboards to sluggish performance and excessive retail prices, here's a selection of machines which stand out as underachievers.

Acer Aspire 2001WLMi

Acer's Aspire 2001WLMi is a behemoth. At first glance it looks a good buy with its 1,200 x 800 pixel wide-screen display and just about every connectivity option available. But the 3kg machine is simply too slow, despite being fitted with 512MB of RAM and a 1.4GHz Pentium M processor.

While the futuristic design may appeal to some, we found ourselves incredibly frustrated by CD playback buttons sitting on the keyboard palm rest. While five hours and 31 minutes under MobileMark 2002's battery tests is stellar, the Aspire 2001 is big, bulky and sluggish. Steer clear.



Details

Contact	Acer Computer Australia
Phone	1300 366 567
Online	www.acer.com.au
Price	\$2,599

✓	Plenty of ports.
✗	Slow.
Verdict	●●○○○

Acer Ferrari 3000LMI

This red and silver machine is arguably the most eye-catching — though some might argue that the design is questionable — notebook ever to grace the pages of APC. In a stroke of marketing "genius", Acer has teamed up with another Ferrari F1 sponsor, AMD, to build a PC based around its Athlon XP-M 2500+ processor.

But while the colour red is usually associated with speed, the link in this case is misplaced. The unit's benchmarks are mid-range, but the price tag is towards the upper end of the scale. Battery life also fails to meet expectations.



Details

Contact	Acer Computer Australia
Phone	1300 366 567
Online	www.acer.com.au
Price	\$3,299

✓	Distinctive.
✗	Expensive.
Verdict	●●○○○

Acer Travelmate 2911Mi

Acer's third notebook may be feature rich, but its performance rating under MobileMark 2002 is abysmal. Scores in the 3DMark tests are just as poor, and waste the 15in screen that ought to be great to play games on.

Not even the Travelmate's comprehensive feature set or reasonable battery life of three hours and 20 minutes are enough to save the day. And there's no formal dead pixel policy included in the one-year international warranty, unless you're prepared to pay a substantial premium.



Details

Contact	Acer
Phone	1300 366 567
Online	www.acer.com.au
Price	\$2,799

✓	Battery life; feature-rich; light.
✗	Graphics performance.
Verdict	●●○○○

AOpen 1556G

You could be forgiven for thinking this 1.5GHz Pentium M-based machine is running on a Pentium III processor given its abysmal benchmark scores. The performance suffers largely because of the lack of memory: 256MB is a bargain-basement quantity of RAM these days.

A 1,024 x 768 pixel screen, CD-RW/DVD combo drive, USB, FireWire, S-Video, parallel, VGA, and SD card slot round out the machine's specs. It manages five hours and four minutes of battery life under MobileMark 2002, but the AOpen 1556G is otherwise uninspiring.



Details

Contact	Bluechip infotech
Phone	1800 803 802
Online	www.bluechipit.com.au
Price	\$2,199

✓	Great battery life.
✗	Poor performance.
Verdict	●●○○○

ASUS S5201N

ASUS has specced a decent little machine for less than \$3,000, but it's not an all-rounder. The keys are too close together and it's a chore to type on, so test the keyboard before shelling out the cash.

It's 17mm thick, weighs 1.3kg and features a 1.5GHz Pentium M processor and 256MB of RAM, but the S5201N is a little small for serious work. The 1,024 x 768 pixel 12.1in display doesn't provide much in the way of screen real estate either. If you're after a compact unit at a modest price, you could do worse. Just be prepared to lug the bundled external optical drive around.



Details

Contact	Cassa Australia
Phone	(07) 3853 5444
Online	www.cassa.com.au
Price	\$2,899
✓	Small, light.
✗	Difficult to use.
Verdict	●●○○○

BenQ Joybook 5100-V04

On paper, the Joybook 5100 is around the middle of the pack: it sports a 1.5GHz Pentium M processor, 512MB of RAM, USB and FireWire ports, and a Radeon Mobility 9000 graphics adaptor driving a 15in 1,024 x 768 pixel panel. But like the Joybook 5000, the 5100-V04 fails to impress.

While battery life is excellent, performance benchmarks are best described as modest. But our biggest complaint is its physical design: the machine features recessed USB ports that limit the peripherals that can be connected. The lack of legacy ports may also be an issue.



Details

Contact	BenQ
Phone	(02) 9714 6815
Online	www.benq.com.au
Price	\$2,999
✓	Great battery life.
✗	Recessed USB ports.
Verdict	●●○○○

Fujitsu LifeBook E4010

While the Fujitsu LifeBook E4010 is a well-built machine, it will set you back around \$3,000 for a 1.4GHz Pentium M processor, a meagre 256MB of RAM and a piddling 40GB hard disk. Performance benchmarks are very ordinary, though battery life is good.

Aside from being slow and overpriced, the Fujitsu suffers from one of the worst keyboard layouts ever seen on a notebook. Every one of our testers commented on its quirky design, and while the key action was comfortable, the layout was universally bagged.



Details

Contact	Fujitsu PC Australia
Phone	1800 288 263
Online	www.lifebook.com.au
Price	\$2,999
✓	Narrow keys; slow.
✗	High-quality display.
Verdict	●●○○○

HP/Compaq nx5000

HP/Compaq's disappointing nx5000 is built around a 1.4GHz Pentium M with onboard Intel Extreme Graphics, 15in display, 40GB hard disk and combo DVD-ROM/CD-RW. The system struggles under benchmarks, especially 3DMark2001, indicating poor 3D performance. Thankfully, a battery rundown time of around three hours and 30 minutes offers a small saving grace.

The fact that HP/Compaq won't even spell out its dead pixel policy should be enough to deter most. Although the nx5000 ships at a modest price, it's horribly slow and tips the scales at nearly 3kg. Buyer beware.



Details

Contact	HP
Phone	1300 301 234
Online	www.hp.com.au
Price	\$2,395
✓	Strong speakers.
✗	Slow.
Verdict	●●○○○

LG LS50-1

While LG's higher-end models are winners, the LS50 doesn't match its more expensive siblings. The specs are modest — 1.4GHz processor, 256MB of RAM, 15in screen, CD-RW/DVD-ROM combo drive — but pretty standard for entry-level Centrino machines.

However, the LS50 recorded the slowest benchmarks of all the machines on test, only managing 90 under MobileMark 2002 and just over 2,000 under 3DMark2001, despite the inclusion of a Radeon 9200 graphics controller. The machine's battery life is its one saving grace.



Details

Contact	LG Electronics Australia
Phone	1800 725 375
Online	www.lge.com.au
Price	\$2,499
✓	Good battery life.
✗	Slowest tested.
Verdict	●●○○○

Pioneer CentriNote 375

Although relatively impressive on paper, Pioneer's only entry in this roundup proves disappointing under benchmarking.

The Pioneer is a budget Centrino unit in every way. The unit's CD-RW/DVD-ROM combo drive, 40GB hard disk and integrated graphics (relying on the i855GM chipset) are all designed to keep the price in check. Specs, features and performance are all lacklustre, and while they might be excused in an ultra-portable, the 375 weighs 2.8kg.

Its only positive features are its low price tag and long battery life.



Details

Contact	Pioneer Computers Australia
Phone	(02) 9690 2888
Online	www.pioneercomputers.com.au
Price	\$2,299
✓	Three-hour battery.
✗	Bulky, slow.
Verdict	●●○○○

Notebook specifications



Model	Acer Aspire 2061WLM	Acer Ferrari 3000LM	Acer Travelmate 291LM	Alien 1556	Alien 1557	Apple PowerBook G4	ASUS A2500	ASUS M600H	ASUS S520L	BenQ Joybook 5000 V022	BenQ Joybook 5100 V04
CPU	Pentium M 1.4GHz	Athlon XP-M 2500+	Pentium M 1.4GHz	Pentium M 1.5GHz	Pentium M 1.7GHz	PowerPC G4 1.25GHz	Athlon XP-M 2600+	Pentium M 1.5GHz	Pentium M 1.5GHz	Pentium M 1.5GHz	Pentium M 1.5GHz
Chipset	Intel 855PM	VIA ProSavage KM400	Intel 855GM	Intel 855GME	Intel 855PM	Intelrepid	SIS 746FX	Intel 855PM	Intel 855GME	Intel 855GM	Intel 855PM
RAM	512MB PC2700	512MB PC2700	512MB PC2100	256MB PC2700	512MB PC2700	512MB PC2700	512MB PC2700	256MB PC2700	256MB PC2700	256MB PC2100	512MB PC2100
GPU	ATI Mobility Radeon 9200 (64MB)	ATI Mobility Radeon 9200 (128MB)	Intel 82855GM (Shared)	Intel 82855GM (Shared)	ATI Mobility Radeon 9600 (64MB)	ATI Mobility Radeon 9600 (64MB)	ATI Mobility Radeon 9600 (64MB)	ATI Mobility Radeon 9600 (64MB)	Intel 82855GM (Shared)	Intel 82855GM (Shared)	ATI Mobility Radeon 9600 (32MB)
Screen size (in)	15.4	15	14	15	15	15.2	15	15.4	12.1	14.1	15
Native resolution	1,280 x 800	1,400 x 1,050	1,024 x 768	1,024 x 768	1,400 x 1,050	1,280 x 854	1,024 x 768	1,024 x 768	1,024 x 768	1,024 x 768	1,024 x 768
HDD	40GB	60GB	40GB	40GB	80GB	80GB	60GB	60GB	60GB	40GB	40GB
CD/DVD	DVD-RW/DVD-RAM/CD-RW	DVD±R/RW	DVD±R/RW	DVD/CD-RW	DVD-R/RW	DVD-RW/DVD-RAM/CD-RW	DVD-R/RW	DVD/CD-RW	External DVD/CD-RW	DVD/CD-RW	DVD+RW
floppy	None	None	None	None	None	None	Yes	None	None	None	None
OS	Windows XP Home	Windows XP Home	Windows XP Home	Windows XP Professional	Windows XP Professional	Mac OS X v10.3	Windows XP Professional	Windows XP Professional	Windows XP Professional	Windows XP Professional	Windows XP Professional
Modem	Agere Systems (V.92)	Agere Systems (V.92)	Agere Systems (V.92)	Agere Systems (V.92)	Agere Systems (V.92)	(V.92)	SoftK56 (V.90)	SoftV92 (V.92)	SoftV92 (V.92)	Agere Systems (V.92)	Agere Systems (V.92)
NIC	Realtek RTL8139/810x (10/100baseT)	VIA Rhine II (10/100baseT)	Realtek RTL8139/810x (10/100baseT)	Broadcom 440x (10/100baseT)	Broadcom 440x (10/100baseT)	10/100/1000baseT	515 900 (10/100/1000baseT)	Broadcom NetXtreme (10/100/1000baseT)	Realtek RTL8139/810x (10/100baseT)	Intel PRO/100 VE 10/100baseT	Intel PRO/100 VE 10/100baseT
Wireless	Intel PRO/Wireless 2100 (802.11b)	802.11g	Intel PRO/Wireless 2100 (802.11b)	Intel PRO/Wireless 2100 (802.11b)	Intel PRO/Wireless 2100 (802.11b)	Apple AirPort Extreme (802.11g)	N/A	Intel PRO/Wireless 2100 (802.11b)	Intel PRO/Wireless 2100 (802.11b)	Intel PRO/Wireless 2100 (802.11b)	Intel PRO/Wireless 2100 (802.11b)
Bluetooth	Yes	Yes	None	None	None	Yes	None	None	None	None	None
IRDA	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	None	Yes	Yes
USB	3	4	3	3	3	2	4	4	3	3	3
IEEE 1394a, b	1, 2	1, 0	1, 0	1, 0	1, 0	1, 1	1, 0	1, 1	1, 0	1, 0	1, 0
TV-out	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	None	Yes	Yes
0-sh	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Serial	None	None	None	None	None	None	None	None	None	None	None
Parallel	1	1	1	1	1	None	1	1	None	None	None
PCMCIA	1	1	1	1	1	1	1	1	1	2	1
Card Reader	MMC, MS, SD, SM	MMC, MS, SD, SM	None	MMC, MS, SD	MMC, MS, SD	None	MMC, MS, MS Pro, SD	MMC, MS, MS Pro, SD	MMC, MS, MS Pro, SD	MMC, MS, SD	MMC, MS, SD
Processor	Realtek AC '97	Vinyl AC '97	Realtek AC '97	Intel ICH4 AC '97	Intel ICH4 AC '97	(Not Specified)	Realtek AC '97	SignalTel C-Major	SoundMax Integrated	SoundMax Integrated	SoundMax Integrated
Ports	Headphone, mic in	Headphone, mic in	Headphone, mic in	Headphone, line in, mic in, SPDIF out	Headphone, line in, mic in, SPDIF out	Headphone, line in	Headphone, line in, mic in	Headphone, line in, mic in, SPDIF out	Headphone, mic in	Headphone, mic in	Headphone, mic in
Pointing Device	Touchpad	Touchpad	Touchpad	Touchpad	Touchpad	Touchpad	Touchpad	Touchpad	Touchpad	Touchpad	Touchpad
Software	CyberLink Power2Go, Director Pro 2.5S, CyberLink PowerDVD, NTL CD and DVD Maker, Aspire Arcade	CyberLink Power2Go, Director Pro 2.5S, CyberLink PowerDVD, NTL CD and DVD Maker	Norton AntiVirus, PowerDVD, NTL CD Maker	Norton AntiVirus, PowerDVD, Nero	Norton AntiVirus, PowerDVD, Nero	iLife '04, Panther OS, Finder, Safari, Mail, Address Book, QuickTime	Nero Express, MediasShow, ASUS DVD, PowerDirector SE	Nero Express, MediasShow, ASUS DVD, PowerDirector SE	Nero Express, MediasShow, ASUS DVD, PowerDirector SE	Note 1	Note 1
Warranty	1-year international	1-year international	1-year international	2-year pickup and return	2-year pickup and return	1-year	2-year international	2-year international	2-year international	1-year RTB	1-year RTB
Dead pixel policy	PerfectPixel Guarantee Optional	PerfectPixel Guarantee Optional	PerfectPixel Guarantee Optional	Replace when > 3 on, > 3 off, or > 5 faulty	Replace when > 3 on, > 3 off, or > 5 faulty	Case-by-case (typically replace when > 5 faults)	Replace when > 2 adjacent on, > 3 on, > 2 adjacent off, > 6 off, or > 8 faulty	Replace when > 2 adjacent on, > 3 on, > 2 adjacent off, > 6 off, or > 8 faulty	Replace when > 2 adjacent on, > 3 on, > 2 adjacent off, > 6 off, or > 8 faulty	Replace when > 3 on, > 3 off, or > 5 faulty	Replace when > 3 on, > 3 off, or > 5 faulty
Dimensions (w x d x h, mm)	360 x 273 x 34	330 x 272 x 31	333 x 276 x 32	326 x 270 x 30	326 x 270 x 30	348 x 241 x 28	328 x 270 x 45	354 x 273 x 34	275 x 223 x 25	320 x 256 x 31	327 x 269 x 31
Weight (kg)	3	2.9	2.6	2.7	2.7	2.5	3.3	2.6	1.3	2.4	2.7

Note 1: Ulead Photo Explorer, CyberLink PowerDVD, CyberLink Power Director Pro, Adobe Acrobat Reader, NTL CD Maker Plus 2000, PC-Cillin 2002, Q-Music, Music and Joyride Integration

apc											
apc											
apc											
Best Joybook 8190	Dell Inspiron 6000	Dell Latitude 2300	Digital Star CL50	F85A CL50	Fujitsu Lifebook E4010	Fujitsu Lifebook S6130	HP/Compaq rx5900	IBM ThinkPad R50	IBM ThinkPad T41	IPEX Companion 53A	ITC Ultraport 1200
Pentium M 1.6GHz	Pentium M 1.7GHz	Pentium M 1.3GHz	Pentium M 1.6GHz	Pentium M 1.6GHz	Pentium M 1.4GHz	Pentium M 1.4GHz	Pentium M 1.5GHz	Pentium M 1.5GHz	Pentium M 1.6GHz	Pentium M 1.6GHz	Pentium M 1.5GHz
Intel 855PM	Intel 855PM	Intel 855GM	Intel 855PM	Intel 855PM	Intel 855GM	Intel 855GM	Intel 855GM	Intel 855PM	Intel 855PM	Intel 855GM	Intel 855PM
512MB PC2700	512MB PC2100	640MB PC2100	512MB PC2100	512MB PC2700	256MB PC2100	256MB PC2700	256MB PC2700	256MB PC2100	512MB PC2100	512MB PC2100	512MB PC2700
ATI Mobility Radeon 9600 (64MB)	ATI Mobility Radeon 9000 (64MB)	Intel 82855GM (64MB)	ATI Mobility Radeon 9000 (64MB)	ATI Mobility Radeon 9000 (64MB)	Intel 82855GM (Shared)	Intel 82855GM (Shared)	ATI Mobility Radeon 7500 (32MB)	ATI Mobility Radeon 7500 (32MB)	ATI Mobility Radeon 7500 (32MB)	Intel 82855GM (Shared)	Nvidia GeForce FX Go5200 (64MB)
15.4	14.1	12.1	15	15	15	13.3	15	15	14.1	15	14
1,280 x 800	1,024 x 768	1,024 x 768	1,400 x 1,050	1,400 x 1,050	1,400 x 1,050	1,024 x 768	1,024 x 768	1,024 x 768	1,024 x 768	1,024 x 768	1,024 x 768
60GB	40GB	40GB	60GB	40GB	40GB	40GB	40GB	40GB	40GB	40GB	60GB
DVD+RW	DVD+RW	DVD+RW/ CD-RW	DVD/CD-RW	DVD/CD-RW	DVD/CD-RW	DVD/CD-RW	DVD/CD-RW	DVD/CD-RW	DVD/CD-RW	DVD/CD-RW	DVD±RW
None	None	None	None	None	None	None	External	None	None	None	None
Windows XP Professional	Windows XP Professional	Windows XP Professional	Windows XP Professional	Windows XP Home	Windows XP Professional	Windows XP Professional	Windows XP Professional	Windows XP Professional	Windows XP Professional	Windows XP Professional	Windows XP Home
Intel HSP56MR (V.92)	BCM (V.92)	Conexant DA80 (V.92)	Intel HSP56MR (V.92)	Intel HSP56MR (V.92)	Agere Systems (V.92)	Agere Systems (V.92)	Agere Systems (V.92)	Agere Systems (V.92)	Agere Systems (V.92)	Agere Systems (V.92)	SmartLink (V.90)
Intel PRO/100 VE (10/ 100baseT)	Broadcom 570x (10/100/ 100baseT)	Broadcom 440x (10/100baseT), Broadcom 570x (100baseT) on Included Media Base	Realtek RTL8139/810x (10/100baseT)	Realtek RTL8139/810x (10/100baseT)	Intel PRO/100 VE (10/ 100baseT)	Intel PRO/1000 MT (10/100/ 100baseT)	Broadcom 440x (10/ 100baseT)	Intel PRO/1000 MT (10/100/ 100baseT)	Intel PRO/1000 MT (10/100/ 100baseT)	Realtek RTL8139/810x (10/100baseT)	Realtek RTL8139/810x (10/100baseT)
Intel PRO/ Wireless 2100 (802.11b)	Intel PRO/ Wireless 2100 (802.11b)	Intel PRO/ Wireless 2100 (802.11b)	Intel PRO/ Wireless 2100 (802.11b)	Intel PRO/ Wireless 2100 (802.11b)	Intel PRO/ Wireless 2100 (802.11b)	Intel PRO/ Wireless 2100 (802.11b)	Intel PRO/ Wireless 2100 (802.11b)	Intel PRO/ Wireless 2100 (802.11b)	Intel PRO/ Wireless 2100 (802.11b)	Intel PRO/ Wireless 2100 (802.11b)	Intel PRO/ Wireless 2100 (802.11b)
None	None	Yes	None	None	None	None	Yes	None	None	None	None
Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	None	Yes
4	2	2	3	3	2	2	2	2	2	3	2
2.0	None	1.0	1.0	1.0	None	1.0	1.0	None	None	1.0	1.0
Yes	Yes	None	Yes	Yes	Yes	None	Yes	Yes	Yes	None	Yes
Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
None	1	1 on included media base	None	None	1	None	1	None	None	1	None
1	1	1 on included media base	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	2	2	2	2	1
None	None	SD	SD	SD	None	Optional	None	None	None	None	MMC, SD
RealTek AC '97	SigmaTel C-Major	SoundMax Integrated Digital	RealTek AC '97	RealTek AC '97	SigmaTel AC '97	RealTek AC '97	SoundMax Integrated Digital	SoundMax Integrated Digital	SoundMax Integrated Digital	RealTek AC '97	RealTek AC '97
Headphone, mic in, SPDIF Out	Headphone, mic in	Headphone, mic in	Headphone, mic in	Headphone, mic in	Headphone, mic in	Headphone, line in, mic in, SPDIF out	Headphone, mic in	Headphone, mic in	Headphone, mic in	Headphone, mic in	Headphone, mic in
Touchpad	Touchpad	Touchpad	Touchpad	Touchpad	Touchpad	Touchpad	Touchpad	Touchpad and trackstick	Touchpad and trackstick	Touchpad	Touchpad
Note 1	Dell QuickSet, InterVideo WinDVD, Roxio Easy CD Creator, OpenManage Instrumentation Agent	Dell QuickSet, InterVideo WinDVD, Roxio Easy CD Creator, OpenManage Instrumentation Agent	WinDVD, Nero Express	WinDVD, Nero Express	Note 2	Note 2	InterVideo WinDVD 4.0, Norton AntiVirus software, Sonic RecordNow 6.5	PC-Doctor, Norton AntiVirus 2003, IBM Rapid Restore Ultra, IBM Record Now	PC-Doctor, Norton AntiVirus 2003, IBM Rapid Restore Ultra, IBM Record Now	EasyCD Creator	Nero Express/ WinDVD
1-year RTB	1-year Limited on-site	3-year on-site	1-year RTB	1-year pickup	1-year International	1-year International	1-year International	3-year	3-year	3-year RTB	1-year
Replace when > 3 on, > 3 off or > 5 faulty	Replace when > 5 faulty	Replace when > 5 faulty	Replace when > 6 faulty	Replace when > 1 faulty	Replace when > 7 faulty	Replace when > 7 faulty	Will not disclose	Note 3	Note 3	Replace when > 2 on or > 2 off	Replace when > 5 faulty, or > 2 faulty in a cluster
352 x 260 x 33	308 x 251 x 33	275 x 234 x 24	300 x 273 x 30	300 x 273 x 30	326 x 273 x 37	293 x 237 x 32	326 x 275 x 37	332 x 269 x 40	311 x 255 x 27	330 x 281 x 32	310 x 260 x 32
2.9	2.8	1.3	2.7	2.7	3	1.9	2.9	2.8	2	2.8	2.5

Note 2: Norman Virus Control, Norman Personal Firewall, PowerDVD 4.0, Power Producer, Fujitsu Hardware Diagnostic, Veritas RecordNow and DLA.

Note 3: Replace when > 0 clusters to two adjacent subpixels faulty, when > 3 subpixels stuck on, when > 3 subpixels stuck off, or when > 5 subpixels faulty.

Notebook specifications continued

	apc				apc				apc			
Manufacturer/Model	L6 UM50-2	L6 UM50-346A	L6 UM50-1	NEC Verso P520	Panasonic Toughbook CF-F3	Pioneer Centrifuge M375C	Prolic Excel G551	Sony VAIO PCG-Z110P	Sony VAIO PCG-V505MNP	Toshiba Peripage H1100	Toshiba Tecra H2	
CPU	Pentium M 1.5GHz	Pentium M 1.6GHz	Pentium M 1.4GHz	Pentium M 1.4GHz	Pentium M 1.4GHz	Pentium M 1.4GHz	Pentium M 1.7GHz	Pentium M 1.7GHz	Pentium M 1.6GHz	Pentium M 1.2GHz	Pentium M 1.4GHz	
Chipset	Intel 855PM	Intel 855PM	Intel 855GM	Intel 855GM	Intel 855PM	Intel 855GM	Intel 855PM	Intel 855PM	Intel 855PM	Intel 855GM	Intel 855PM	
RAM	256MB PC2700	512MB PC2700	256MB PC2700	256MB PC2100	256MB PC2100	512MB PC2100	256MB PC2100	512MB PC2700	512MB PC2700	256MB PC2700	256MB PC2700	
GPU	ATI Mobility Radeon 9200 (64MB)	ATI Mobility Radeon 9600 (64MB)	ATI Mobility Radeon 9200 (64MB)	Intel 82855GM (Shared)	ATI Mobility Radeon 7500 (32MB)	Intel 82855GM (Shared)	ATI Mobility Radeon 9000 (64MB)	ATI Mobility Radeon (16MB)	ATI Mobility Radeon 9200 (32MB)	Intel 82855GM (Shared)	Nvidia GeForce FX Go5200 (64MB)	
Screen size (in)	15	15	15	15	13.3	15.4	15	15	12.1	12.1	14.1	
Native resolution	1,024 x 768	1,024 x 768	1,024 x 768	1,024 x 768	1,024 x 768	1,024 x 768	1,024 x 768	1,400 x 1,050	1,024 x 768	1,024 x 768	1,024 x 768	
HDD	40GB	60GB	40GB	40GB	40GB	40GB	40GB	60GB	60GB	60GB	40GB	
CD/DVD	DVD/CD-RW	DVD/CD-RW	DVD/CD-RW	DVD/CD-RW	DVD/CD-RW	DVD/CD-RW	DVD/CD-RW	DVD-RW	DVD/CD-RW	DVD/CD-RW	DVD/CD-RW	
floppy	None	None	None	Yes	None	None	None	None	None	None	None	
OS	Windows XP Home	Windows XP Home	Windows XP Home	Windows XP Professional	Windows XP Professional	Windows XP Home	Windows XP Professional	Windows XP Professional	Windows XP Professional	Windows XP Professional	Windows XP Professional	
Modem	Agere Systems (V.92)	Agere Systems (V.92)	Agere Systems (V.92)	Agere Systems (V.92)	Panasonic (V.92)	SmartLink (V.90)	Actiontec AC '97 (V.92)	CXTX AC-Link (V.92)	CXTX AC-Link (V.92)	(V.90)	(V.92)	
NIC	3Com 3C920 (10/100baseT)	3Com 3C920 (10/100baseT)	3Com 3C920 (10/100baseT)	Intel PRO/100 VE (10/100baseT)	Realtek RTL8139/810x (10/100baseT)	Realtek RTL8139/810x (10/100baseT)	Realtek RTL8139/810x (10/100baseT)	Intel PRO/100 VE (10/100baseT)	Intel PRO/100 VE (10/100baseT)	Intel PRO/100 VE (10/100baseT)	Intel PRO/1000 MT (10/100/1000baseT)	
Wireless	Intel PRO/Wireless 2100 (802.11b)	Intel PRO/Wireless 2100 (802.11b)	Intel PRO/Wireless 2100 (802.11b)	Intel PRO/1000 MT (10/100/1000baseT)	Intel PRO/Wireless 2100 (802.11b)	Intel PRO/Wireless 2100 (802.11b)	Intel PRO/Wireless 2100 (802.11b)	Intel PRO/Wireless 2100 (802.11b)	Intel PRO/Wireless 2100 (802.11b)	Intel PRO/Wireless 2100 (802.11b)	Intel PRO/Wireless 2100 (802.11b)	
Bluetooth	None	None	None	None	None	None	None	None	None	None	None	
USB	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
IEEE 1394a, b	1, 0	1, 0	1, 0	None	None	1, 0	1, 0	1, 0	1, 0	1, 0	1, 0	
TV-out	Yes	Yes	Yes	Yes	None	Yes	Yes	None	None	None	Yes	
D-sub	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Serial	None	None	None	1	1	1	None	None	None	None	None	
Parallel	1	1	1	1	None	None	1	None	None	None	1	
PCMCIA	1	1	1	2	2	None	1	1	1	2	2	
Card Reader	SD	SD	SD	None	None	None	None	MS	MS	MMC, SD	None	
Processor	SoundMax Integrated Digital	SoundMax Integrated Digital	SoundMax Integrated Digital	SoundMax Integrated Digital	SigmaTel AC '97	Intel ICH4 AC '97	RealTek AC '97	Yamaha AC-XG	Yamaha AC-XG	SoundMax Integrated Digital	ADI AC '97	
Ports	Headphone, mic in	Headphone, mic in	Headphone, mic in	Headphone, mic in	Headphone, mic in	Headphone, mic in, SPDIF out	Headphone, mic in	Headphone, mic in	Headphone, mic in	Headphone, mic in	Headphone, mic in	
Pointing device	Touchpad	Touchpad	Touchpad	Touchpad	Touchpad	Touchpad	Touchpad	Touchpad	Touchpad	trackstick	Touchpad and trackstick	
Software	Norton AntiVirus 2004	Norton AntiVirus 2004	Norton AntiVirus 2004	CyberLink Power2Go, Record Now DX	None listed	PowerDVD/Roxio CD Creator	WinDVD, Easy CD Creator	Adobe Photoshop Elements 2.0, Adobe Premiere 6.5, Easy Systems Drag'n Drop CD+DVD 3.0, InterVideo WinDVD 5.0	Adobe Premier 6.5, InterVideo WinDVD 4.0, Norton AntiVirus 2003	InterVideo WinDVD, Drag'n Drop CD/DVD	Drag'n Drop CD+DVD, InterVideo WinDVD, Toshiba Management Console and ConfigFree, Microsoft OneNote, Toshiba IP Phone	
Warranty	18-month RTB	18-month RTB	18-month RTB	1-year RTB	3-year RTB	1-year on-site, 3-year labour	2-year International limited	1-year	1-year	3-year International	1-year International	
Dead pixel policy	Replace when > 3 faulty	Replace when > 3 faulty	Replace when > 3 faulty	Replace when > 0 faulty when horizontally adjacent and same colour, > 5 faulty of the same colour, or > 9 faulty	Replace when > 2 faulty	Replace when > 2 faulty	Replace when > 7 faulty	Replace when 3 clustered or dead pixels "interfere with usability"	Replace when 3 clustered or dead pixels "interfere with usability"	Replace when > 5 faulty	Replace when > 5 faulty	
Dimensions (w/h, mm)	331 x 274 x 27	331 x 274 x 27	335 x 274 x 31	327 x 270 x 37	297 x 254 x 43	360 x 273 x 28	326 x 258 x 25	316 x 248 x 39	277 x 242 x 35	270 x 248 x 38	314 x 259 x 34.9	
Weight (kg)	2.4	2.4	2.4	3.4	2.2	2.8	2.6	2.1	2	2	2.3	

Notebook performance

[illegible]

Tablet PCs

Looking for a notebook worth writing home about?

Valens Quinn gets his pen out and puts the latest batch of Tablet PCs to the test.

Since its launch over a year ago, the Tablet PC has established itself as a credible new addition to the notebook form factor. Ideal for situations where a person needs to hold a notebook in one hand and enter data with the other, Tablet PCs provide this freedom through a pen-driven interface and handwriting recognition technology. While Microsoft Windows XP Tablet Edition is still in its first major build, many manufacturers have released second generation Tablet PCs featuring significant improvements over their first products.

By far the most notable improvement to the Tablet PC has been the introduction of Intel's Centrino Mobile Technology. Centrino has seriously upped the ante in terms of battery life and performance expectations for mobile computing, and the combination of processor, chipset and wireless network adaptor has enabled Tablets to reach smaller form factors.

This month's selection of Tablet PCs can be split into two different varieties: "convertible" and "slate". A convertible Tablet PC gets its name because it can convert from a traditional clam shell configuration to a Tablet by swivelling its display 180 degrees. Convertibles provide both pen and keyboard interfaces, and are the most common choice of form factor because of this versatility.

A slate, on the other hand, consists of just the display panel and only supports a pen interface — there's no keyboard. Slates are generally lighter and smaller, ideal for warehouse and shop floor applications. The Motion Computing M1300 featured here comes in a slate configuration, but an external USB keyboard is included as well.

While there are only a handful of Tablet PC manufacturers in Australia, you may notice some big name exclusions in this month's crop of participants. While Viewsonic has pulled out of the Tablet PC market in Australia, HP, Panasonic and NEC were unable to provide us with test units as they didn't have any available for review.

How we tested

Each Tablet PC was tested in its out-of-box configuration, and screen resolutions were set to 1,024 x 768 in 16-bit colour. The benchmark test suite consisted of MobileMark2002 for measuring 2D application performance as well as battery life. Hard disks were defragmented before testing and batteries were conditioned by a full discharge and recharge. All power saving, hibernate and suspend mechanisms were disabled for the battery test, while machines were plugged into the mains for performance and graphics tests.

The Pro versions of 3DMark2001 and 3DMark2003 were employed to test 3D graphics performance, although some of the machines on test did not have hardware to support all of the 3D tests — this was most apparent with 3DMark2003. The units were also evaluated in bright, direct sunlight for anti-glare and screen visibility, and used in both notebook and Tablet PC configurations.



Toshiba Portégé M200

Notebook specialist Toshiba has produced another winner. The M200's combination of clever design, robust build quality and comprehensive feature set puts it ahead of the pack.

The M200 features a 1.4GHz Pentium M processor with 512MB of RAM and 60GB hard drive. The 12.1in display is outstanding, running at an ultra-crisp 1,400 x 1,050 pixels. This translates into smoother digital ink and a more realistic handwriting experience. Text and icons appear smaller at this resolution, but they're still exceptionally sharp and clear.

A sturdy magnesium alloy shell protects the M200's LCD panel, and the stainless steel swivel hinge is based on the same robust design used on the Portégé 3500. There's also a breakaway pin designed to snap before the swivel is damaged, dramatically saving on repair costs.

Toshiba also breaks new ground by integrating an "accelerometer" into the M200. This device senses which way the unit is held and adjusts the screen to the correct orientation with the press of a button.

In Tablet mode, you can access the five-way navigation control joystick, screen rotation and Ctrl, Alt and Delete buttons along the far edge of the bezel, plus four pen-triggered, programmable "hotspots". The main power switch is also situated on the bezel and there's a lock to prevent hitting the power button by mistake. A stylus rests in a spring-loaded hole on the M200's base, with a spare in the battery bay.

The Toshiba has most of the usual ports, excluding only FireWire and TV-out. It's also missing an optical drive, however, there is an SD card reader, and you can add Bluetooth functionality with an optional mini-PCI card.

Toshiba Console and ConfigFree utilities make configuring hardware and network settings easy. Also included is Sensiva's Symbol Commander, OneNote 2003 and a utility enabling you to log on to Windows via handwriting recognition.

The M200 is expensive at \$4,290, but its list of features is impressive and it performs well in benchmark tests, especially 3D graphics. Battery life is also good, rounding out this excellent example of engineering quality.

Details

Contact	Toshiba
Phone	13 30 70
Online	www.isd.toshiba.com.au
Price	\$4,290
MobileMark performance	167
MobileMark battery (min)	185
Weight (kg)	2.0
✓	Great engineering; superb display.
✗	Expensive; needs an optical drive.
Verdict	★★★★

Acer TravelMate C300

While the TravelMate C300 is fully equipped and undoubtedly powerful, its size raises questions about how well it fits into the Tablet PC genre.

Acer has positioned the C300 as a "premium desktop replacement Tablet PC". The 14.1in display makes the Acer unwieldy in the traditional two-handed Tablet configuration. However, the C300 excels as a notebook. It has a user-friendly keyboard and enough space on the base unit to house a DVD-ROM/CD-RW combo drive.

The C300 is built around a 1.4GHz Pentium M processor and 512MB of RAM. A 60GB hard disk rounds out the storage.

The machine's spacious display looks good, but its 1,024 x 768 resolution

seems low for the panel size. An auto brightness adjuster senses the ambient light and varies the screen's brightness accordingly.

The Acer features integrated Bluetooth wireless networking as standard, complementing its 802.11b wireless capability. There is no integrated card reader, but Acer supplies an external four-in-one reader that fits into the PC Card slot. Other connectivity options include a single FireWire port, Gigabit Ethernet, S-Video TV-out connector, plus a built-in smartcard reader. Two smartcards are provided.

The C300 is a superb little PC, but it's not a true Tablet.

Details

Contact	Acer
Phone	1300 366 567
Online	www.acer.com.au
Price	\$3,999
MobileMark performance	186
MobileMark battery (min)	258
Weight (kg)	2.7
✓	Impressive battery life; comfortable keyboard.
✗	Lacklustre 3D graphics; low-res display.
Verdict	●●●●○

Fujitsu LifeBook T3010

The Fujitsu LifeBook T3010 has a convertible configuration similar to the Portégé and Acer C300. But the LifeBook's metallic blue finish, smaller size and marginally lighter weight make it stand out.

The metal hinge secures the LCD and provides 180 degree rotation. There's also a two-way latch for closing the unit or securing the panel in Tablet mode — this can be fiddly, but ensures the panel is held securely in use.

The keyboard is solid and responsive. The LifeBook has the largest touchpad on test, and is supported by two mouse buttons and a two-way scroll button.

The LifeBook's stylus is neatly stored in a slot in the border of the display, though the pen's lack of eraser tip is inexcusable at this price.

The display is clear and bright, and orientation modes can be changed via one of the five buttons along the bezel. The other buttons provide only basic Tablet functions. An LCD indicator panel along the bottom edge of the display gives basic system information, but this is hidden when the unit is closed.

Although the LifeBook looks good and works well in both Tablet and notebook modes, the unit is let down by its price. It has the best warranty in the line-up, but the LifeBook needs a price cut to be competitive in this field.

Details

Contact	Fujitsu
Phone	1800 288 283
Online	www.fujitsu.com.au
Price	\$3,999
MobileMark performance	170
MobileMark battery (min)	132
Weight (kg)	1.9
✓	Three year warranty; compact form factor
✗	Expensive.
Verdict	●●●●○

Motion Computing M1300

The M1300 is the only Tablet PC in this roundup that comes in a slate configuration. It's also the lightest and thinnest. It's ideal for users requiring a Tablet PC without the bulk of a keyboard, though a

fully-functional external USB keyboard is bundled with the basic package.

A plastic desktop stand is supplied to prop up the M1300 in either portrait or landscape positions. A hard top cover is also provided to protect the LCD, snapping to the back of the unit when not in use.

Clad in a magnesium alloy case, the M1300 feels solid enough to take a few knocks, but this

may also contribute to the problem of heat transmission — the M1300 becomes too hot to hold for more than 15 minutes with a bare arm. The optional leather case would certainly make it more comfortable.

The 12.1in LCD is clear, though not as bright as the Acer's, and the screen's backlight is adjustable via the Dashboard software. Nice touches include a FireWire port, and the Li-ion battery has a handy LED charge indicator. It's built on a 1GHz Pentium M processor, with 768MB of RAM and a 40GB hard drive.

The M1300 is ideal for anyone wanting Tablet form factor, but who doesn't need high-end processing or 3D graphics power.

Details

Contact	GSoft Computer
Phone	(08) 8284 1266
Online	www.gs.com.au
Price	\$2,999
MobileMark performance	142
MobileMark battery (min)	179
Weight (kg)	1.4
✓	Option of pen-only interface; compact.
✗	Generates excessive heat.
Verdict	●●●●○

Handhelds

PDA's combine plenty of power with portable form factors. *Jenneth Orantia* gets her mitts on the latest top-of-the-range models.

The current crop of top-end handhelds are light years away from the mono screens, minuscule memory capacities and snail-like processors of old. Today they can be used to jump on the Internet, play MP3s and video, and display Office documents in their native format, usually out-of-the-box. Speedy processors from the likes of Intel, Samsung and Texas Instruments are now the norm, and screen resolutions are also steadily increasing.

Manufacturers are adding wireless technology into their flagship models, usually Bluetooth or Wi-Fi (and sometimes both), increasing their versatility when away from the office. The addition of all these features usually results in a package noticeably larger than their more basic counterparts, although not much more so than the original generation of handhelds.

The good news is that the average asking price for a PDA has dropped dramatically, even as more features are added. Where once the cost of a high-specced unit was comparable to a budget laptop, many of the latest generation are closer to the \$1,000 mark, give or take a couple of hundred bucks.

PDA choice largely comes down to individual needs and preferences. Those accustomed to a particular operating system, for instance, may prefer to stick to such devices for familiarity. Size, performance, screen resolution, wireless and memory card support are other considerations.

But battery life is arguably the major concern. PDA cells generally top out at around 1,500mAh — usually enough to get you through the day without recharging. But faster processors, high-res colour screens and wireless communication features can take a hefty toll on a battery, particularly when running intensive applications like surfing the Internet wirelessly and playing MP3s.

This roundup of seven PDA's represents the best that each manufacturer has to offer. Unfortunately, a few manufacturers were unable to submit units for this review. Hewlett-Packard and ASUS were unable to provide us with review samples of their handhelds in time, while Viewsonic simply refused to participate, leading us to question the company's confidence in its product.

How we tested

Benchmarks for Palm and Pocket PC devices are obtained using Speedy 3.3 and Spb Benchmark respectively. However, it's important to note that performance benchmarks can't be directly compared between the two platforms.

Battery life estimates are those quoted by the manufacturer, and are typically calculated on 30 minutes of use per day.



Sony CLIÉ PEG-TH55

Of all the PDA manufacturers, Sony has the best track record for innovation. The PEG-TH55 continues this solid reputation by being the first CLIÉ to offer 320 x 480 resolution in a tablet-style form. Further adding to its appeal is the integrated 310kilopixel camera (capable of taking shots at up to 640 x 480) and the 802.11b Wi-Fi capability. Also making its debut is Sony's new CLIÉ Organizer application, which emulates the feel of a traditional paper organiser.

One of the first things you notice about the TH55 is its compact size. Despite being packed with features, it's surprisingly svelte, weighing just under 185g with the flip cover attached (165g without). The camera sits on the back of the unit, with a dedicated capture button as well as a lens cover slide on the left. The clear plastic flip cover combined with the attractive matte black finish means the device can be put in a pocket or bag without a case — which is good, since no case is supplied.

As with the CLIÉ PEG-UX50, the TH55 uses Sony's proprietary Handheld Engine, which scales processor speed anywhere from 8MHz to 123MHz, depending on CPU load. Due to this scaling property, the Sony doesn't benchmark as well as might be expected, scoring a low 758. However, video playback and gameplay is outstanding thanks to the digital signal processor and graphics accelerator chip. Just 32MB of usable memory is built-in, but a Memory Stick Pro slot ensures provision for more. Battery life is quoted at a respectable four hours and 30 minutes.

Yet another innovative feature of the TH55 is the placement of the jog dial. Traditionally these have been situated on the left side, which works well for scrolling through documents and options — if you're right-handed. By putting the jog dial at the back, it caters for both left- and right-handers and is also comfortable and intuitive to use.

Sony cuts a few corners by not bundling a case, earphones or even a cradle with the PEG-TH55. However, considering the wealth of practical features, compact size and very reasonable price, the TH55 represents excellent value.

Details

Contact	Sony
Phone	1300 720 071
Online	www.sonymobile.com.au
Price	\$799
✓	Compact; good value; great features.
✗	Slower processor.
Verdict	★★★★



Carrier Devices

i-mate Pocket PC 2003

The i-mate Pocket PC 2003 is a follow-up to the wildly successful Pocket PC Phone Edition, and has addressed a lot of its predecessor's shortcomings. It's much sleeker and rounder, does away with the external aerial, and has significant improvements under the bonnet.

Consistent with the current camera phone craze, the i-mate features a VGA camera on its rear, capable of taking pictures up to 640 x 480 as well as video clips in AVI, MPEG-4 and H.263. While the quality isn't that much better than those found in other phones, it's extremely easy-to-use, with a full-screen viewfinder and a good set of supporting photo applications.

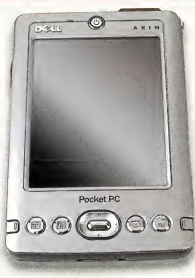
While it's much larger than the average-sized mobile phone, it's still a capable handset. Triband GSM capability (900/1800/1900MHz) means it can be used almost anywhere in the world, and the GPRS class B radio allows for easy Internet connectivity. Phone numbers are dialled using an onscreen keyboard, with dedicated buttons for answering and ending calls. Integrated Bluetooth allows for use of wireless headsets, though the profiles supported are pretty limited.

The i-mate's 400MHz PXA263 XScale processor benchmarks at 1,338.9, meaning it's no slouch when it comes to speed. A very generous helping of usable memory further sweetens the deal, with 128MB of RAM and 14.5MB of Flash ROM. It also has an SDIO expansion slot, leaving open the possibility of adding an SD Wi-Fi card for maximum connectivity. Battery life (using a 1,200mAh Lithium-ion battery) is rated at a decent 2 to 4 hours' talk time and PDA usage time of approximately 13 hours.

One serious shortcoming is that the OS can only handle 32 processes at any one time. Although this is usually more than enough for most Pocket PCs, the i-mate starts up with 22 processes running, which is a recipe for instability once you start running other applications simultaneously.

Details

Contact	Telstra
Phone	13 18 00
Online	www.telstra.com.au
Price	\$1,449
✓	Lots of memory; integrated camera.
✗	Limited Bluetooth options; multiple process instability; expensive.
Verdict	●●●○○



Dell Axim X3i

Dell's Pocket PCs have always put function before flair, and the X3i is no exception. It has a distinctly plastic feel to it that detracts from its otherwise decent feature set, and the design of the unit unfortunately brings to mind the "beige box syndrome" that plagues budget PCs.

However, if you look past the rather homely exterior, the X3i has a lot going for it. Like the Toshiba e800, it's available in either a Bluetooth or Wi-Fi configuration, with the latter slightly more expensive. We chose the Wi-Fi model, which adds a small aerial nub to the top right-hand side of the unit. A dedicated button on the bottom right quickly switches on the Wi-Fi radio, causing the aerial to flash blue — an excellent feature which reduces "tap time" considerably.

The 400MHz PXA263 XScale processor means the X3i packs a powerful punch — it benchmarks at an admirable 1,177.1 and feels very zippy in use. A sizeable amount of memory is onboard in the shape of 64MB of RAM (55MB usable) and 64MB of Flash ROM (33.5MB usable), the latter for permanent storage of important files and backups.

Unlike the earlier X5 model, the X3i only offers a single SDIO expansion slot, presumably to slim down the unit. And it certainly feels quite light, weighing in at 136.5g, the lightest in this group. Sadly, the much-acclaimed battery from the X5 has also been downsized to 950mAh to accommodate the smaller form factor, resulting in a significantly shorter runtime.

The X3i is the cheapest PDA in this group to offer Wi-Fi, though cost savings can be seen in the meagre software bundle in the package. However, a decent slipcase is included, as well as a futuristic-looking cradle that is capable of charging both the unit and a second battery.

For the cost-conscious user after a modestly-priced handheld with decent specifications and built-in Wi-Fi, the X3i is well worth a look.

Details

Contact	Dell
Phone	1300 303 107
Online	www.dell.com.au
Price	\$599.50
✓	Great value; integrated Wi-Fi.
✗	Cheap construction; poor software bundle.
Verdict	●●●○○



Mitac Mio Digiwalker 558

The Digiwalker 558 easily offers the best value for money in this roundup. Not only does it have both CompactFlash and SecureDigital slots, it also boasts both Bluetooth and 802.11b Wi-Fi. This gives users the best of both worlds — maximum expandability as well as multiple connectivity options.

Like a couple of the other Pocket PCs in this roundup, the 558 uses the latest 400MHz PXA263 XScale chip. But despite the fact that others using this processor easily sail past the 1,000 mark during testing, the Digiwalker crawls in at a disappointing 646.41. On the plus side, it features a decent amount of onboard memory — 32MB of usable Flash ROM and 61MB of usable SDRAM. Another interesting feature is its ability to double as a Wi-Fi USB dongle for a desktop or laptop computer. After downloading the driver from the Web site, a PC can use the 558 to connect to a Wi-Fi network.

Despite its impressive specs, the 558 is housed in a relatively ordinary-looking silver plastic case, with no distinguishing characteristics. Considering its feature set, its larger size (coming close to the Toshiba e800 in both length and girth) is understandable. However, unlike the e800, it only features a 3.5in screen. Another oddity is that the headphone jack is of the smaller 2.5mm variety, requiring an adaptor (not included) to connect standard 3.5mm earphones — a unit of this size should be able to accommodate the larger 3.5mm jack.

The unit ships with the backup battery turned off, which means removing the main 1,200mAh Li-ion battery immediately wipes the device of its contents. Turning the backup battery on requires removing the main battery and moving a switch inside the compartment to on — though why someone would want to turn it off in the first place is a mystery. The absence of any additional software on the accompanying CD is also a disappointment.

Details

Contact	eProcess Technologies
Phone	(03) 9880 7307
Online	www.justmio.com
Price	\$749
✓	Great value; integrated Wi-Fi and Bluetooth.
✗	Meagre software bundle; poor performance in benchmark.
Verdict	●●●○○



palmOne Tungsten T3

If you're after a compact form factor and a lot of power, it's hard to go past the Tungsten T3. Representing the third iteration of palmOne's successful Tungsten T series, it uses the same collapsible screen design, but goes further by adding a virtual graffiti area. This takes the resolution up to 320 x 480 when the device is fully extended, significantly increasing screen real estate.

Unlike most of the PDAs in this roundup, palmOne opted to integrate Bluetooth rather than Wi-Fi into the device. This may well have been a battery conservation exercise, since it performs quite poorly in this respect, conking out after around three hours of normal usage. To top it off, the battery isn't replaceable, so keeping a charger in close proximity is recommended. There are no complaints when it comes to speed though — the 400MHz PXA255 Intel XScale chip means apps open and respond instantly. It also benchmarks at a rip-roaring 1,875.

The bundle of software included with the device clearly demonstrates its intended corporate market. Documents To Go 6 Premium Edition means you can use the device to read and edit Word, Excel, PowerPoint and PDF files, as well as read email and view pictures — all in their native format. The T3's ability to change orientation from portrait to landscape on-the-fly further adds to its versatility — just hook it up to the palmOne wireless infra-red keyboard and you've got a highly portable mobile workstation. The Web Pro browser is a joy to use in landscape, and connecting to the Internet via Bluetooth is a no-brainer using the Phone Link app.

The T3 packs in 64MB of RAM (52MB usable), which means you have plenty of space to install applications from the software CD and more besides. But as the T3 is also fully capable of playing video and music (using the bundled Kinoma Player and RealOne Mobile Player), the included SDIO slot is appreciated for boosting memory, as well as allowing for add-ons such as digital cameras.

Details

Contact	palmOne
Phone	(02) 9844 5420
Online	www.palmone.com/au
Price	\$799
✓	Collapsible screen; speedy; excellent software package.
✗	Poor battery; no Wi-Fi.
Verdict	●●●○○

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Toshiba e800

The e800 is Toshiba's strongest Pocket PC competitor yet. It's the first mainstream PDA to offer VGA resolution and also backs this up with a roomy 4in screen. In terms of specs, the e800 features serious power. It uses the latest PXA263 Intel XScale CPU, which screams through the Sph Benchmark with a score of 1,352. A choice between integrated Wi-Fi or Bluetooth further broadens the e800's appeal — either option making it a great mobile Internet companion, particularly when paired with a beefy 1,320mAh Lithium-ion replaceable battery.

Expandability is another of the e800's strong points. Unlike many PDAs on the market, it offers dual expansion by way of CompactFlash and SecureDigital slots, both of which are capable of taking in peripherals as well as additional memory. However, the latter isn't really much of a concern, considering that it comes with 128MB of RAM and nearly 32MB of usable Flash ROM.

It's certainly more attractive than its predecessors, with a smooth, midnight blue chassis and sleek silver side grips. Due to the larger screen, it's also noticeably bigger than most of its competitors,



weighing in at 193g. But the e800 is still more portable than the smallest laptop, making it a viable alternative for those with modest mobile computing needs.

Toshiba's crippled implementation of 480 x 640dpi resolution is disappointing, especially considering that it's the main attraction. Out-of-the-box, the e800 is only able to run a handful of document viewer applications in VGA, and then only after soft resetting the device and using a completely different UI. Part of the problem lies in the lack of native support for resolutions higher than 240 x 320 in Windows Mobile 2003. Using a third party hack called ResFix enables system-wide VGA mode in all applications which support it, leaving

us to ponder why Toshiba didn't offer this functionality in the first place.

The e800's stunning feature set doesn't come cheap though, as a premium price tag places it out of reach of most casual users. However, this isn't necessarily a bad thing as the e800 is clearly a product aimed at the corporate world.

Details

Contact	Toshiba
Phone	13 30 70
Online	www.toshiba.com.au
Price	\$1,199
✓	Dual expansion; built-in Wi-Fi.
✗	Limited VGA capability; pricey.
Verdict	●●●○

Handheld specifications



Model	Carrier Devices i-mate Pocket PC 2003	Dell Axim X3i	MITAC Mio Digwalker 558	palmOne Tungsten T3	Sony CLIE PEG-TH55	Toshiba e800
Price	\$1,449	\$599.50	\$749	\$799	\$799	\$1,199
OS	Windows Mobile 2003 Pocket PC Phone Edition	Windows Mobile 2003	Windows Mobile 2003	Palm OS 5.2.1	Palm OS 5.2.1	Windows Mobile 2003
Processor	400MHz PXA263 Intel XScale	400MHz PXA263 Intel XScale	400MHz PXA263 Intel XScale	400MHz PXA255 Intel XScale	Sony Handheld Engine	400MHz PXA263 Intel XScale
RAM	128MB (126MB usable)	64MB (55MB usable)	64MB (61MB usable)	64MB (52MB usable)	32MB (usable)	128MB (126MB usable)
ROM	64MB (14.5MB usable)	64MB (33.5MB usable)	32MB (32MB usable)	16MB	32MB	32MB (31.22 usable)
Screen resolution (pixels)	240 x 320	240 x 320	320 x 320	320 x 480	320 x 480	480 x 640
Bluetooth	Yes	Either Bluetooth or Wi-Fi	Yes	Yes	No	Either Bluetooth or Wi-Fi
Wireless	802.11b	Either Bluetooth or Wi-Fi	802.11b	No	802.11b	Either Bluetooth or Wi-Fi
Expansion	SDIO	SDIO	CompactFlash Type II, SDIO	SDIO	SDIO	CompactFlash Type II, SDIO
Battery life (hours)	2-4 talktime; 13 POA usage	4	10	4	4.5	10
Sph benchmark	1,338.9	1,177.1	646.41	1,875	758	1,352
Weight (grams)	190	136.5	170	156	185	193

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Smartphones

Can you really get by with just one electronic device in your pocket? **Anthony Caruana** rounds up nine of the new wave of Smartphones.

One of the biggest technology trends of the last few years has been convergence. Recent research from IDC shows that the line between PDAs and mobile phones has blurred to the point where a new product category, the Smartphone, has emerged.

Some Smartphones are PDAs with additional phone features. Others are mobile phones with added personal information management functions. Either way, what you get is a device that can be used to maintain contact with the world, read and manage a diary, and even provide entertainment.

When choosing a Smartphone, it's important to consider which features you'll use most often. Are you looking for an organiser to occasionally use as a phone? Or are you a heavy phone user who wants to keep track of diary appointments and access email? Do you need the capacity to do lots of data entry or are you looking to be entertained on the road?

If mobile phone capability is the major concern, the Nokia 6600, Motorola MPx200, Sony Ericsson T630 or O2 Xphone/i-mate Smartphone2 are the better options. If PDA functions are more important, the Handspring Treo 600 or O2 Xda II will suit. Then there's the Nokia N-Gage, a gaming device, PDA and phone all-in-one.

This line-up has something for everyone. All feature GSM and GPRS connectivity, and most feature Bluetooth and infra-red support. From mobile phones with some personal information management (PIM) support through to full-blown multimedia pocket powerhouses and gaming devices, there's plenty of choice.

While major mobile phone makers are represented here, there are a couple of names that you might not be familiar with. However, with operating systems such as Palm OS, Windows Mobile and Symbian and an abundance of different features, there's bound to be a Smartphone that works for you.

How we tested

Each Smartphone was tested in the field for a minimum of eight hours using the same SIM card where possible. Signal strength, ease of use, ergonomics, features and price were all considered.

For the startup test, each phone was powered off and reset to factory defaults. It was then turned on and timed with a stopwatch to determine the time it takes from switching the phone on to being able to dial a number and to read a number from the SIM card. This test was carried out three times and the results averaged.

Talk and standby times for each unit are as stated by the manufacturers, as both vary depending on individual usage patterns.



O2 Xphone/i-mate Smartphone2

With such a diverse field to select from, choosing the winner was extremely difficult. All Smartphones in this Labs Challenge are solid performers and have something to offer in a diverse marketplace. The O2 Xphone and i-mate Smartphone2 are the winners by virtue of being the most feature-packed models in the group.

The Xphone and Smartphone2 are actually the same phone, manufactured by HTC and branded by two different distributors. Fitting into the classic mobile phone form factor, the Xphone/i-mate are really mobile phones with PDA features rolled in. With a powerful TI OMAP 710 powerplant running at 132MHz, performance is responsive. While the 32MB of RAM isn't the highest in this batch, it's the highest of the phone-sized devices. Throw in the accessible SD/MMC memory slot and you have a unit that gives ready access to personal information while providing great communications and entertainment functions.

Size and shape is reminiscent of the popular Nokia 6310 and, although lacking a stylus, the operating system (Windows Mobile 2003 for Smartphones) is well integrated with the device. This makes it easy to navigate with the joystick and keypad. A launch button opens a list of applications, like the familiar Windows Start button.

There's enough battery life to get through the day for all but the most fervent phone user. Some of the other phones boast longer talk times, but none offers the same range of features and functions.

Integrated Bluetooth is handy for using a wireless headset or connecting to a similarly-equipped PC for syncing with a diary, contacts and email. The VGA camera takes reasonable snaps in different lighting conditions, while the supplied hands-free kit doubles as a pair of stereo headphones.

Desktop PIM support is limited to Outlook using the Activesync application with the bundled USB cable. If you use a different desktop PIM, you'll need to buy extra software.

The i-mate Smartphone2 and O2 Xphone are strong performers in a demanding market. As well as delivering great form and function, they are pushing the envelope of what a phone can do.

Details

Contact	Brightpoint/Telstra
Phone	1300 300 213/131 800
Online	www.brightpoint.com.au www.telstra.com
Price	\$799
✓	Intuitive interface.
✗	Limited PIM support.
Verdict	●●●●●

02 Xda II

The Q2 Xda II is one of two devices in this roundup to take the typical PDA form, adding GSM and GPRS capability to what is generally a well-equipped Pocket PC. It runs Windows Mobile 2003 and has 128MB of RAM, making it the highest specced model in this review. Like the Xphone/i-mate Smartphone, there's a corresponding i-mate Pocket PC Phone Edition (see review on page 103) device which will be distributed by different carriers.



The Xda II is a great performer. The clear, bright screen displays input from the VGA camera mounted into the back of the device. With the full suite of Windows Mobile applications, this makes a great PDA even without the integrated phone.

Using the Xda II as a phone takes some getting used to. Holding a PDA to your face like a standard handset isn't very comfortable. However, when combined with a wireless headset the Xda II makes a great phone. The onscreen keypad can be used with one finger, meaning the stylus can be left in its holder. It's comfortable to use as a PDA, and its lack of external antenna gives it a slick look.

Desktop synchronisation with the supplied USB cradle, Bluetooth and infra-red are all available using Microsoft's Activesync with the included copy of Outlook XP.

It's pretty hard to fault the Xda II. Though predominantly a PDA device, it has excellent phone features and users familiar with the Windows interface will find it a breeze to use.

Details

Contact	Brightpoint
Phone	1300 300 213
Online	www.brightpoint.com.au
Price	\$1,599
✓	Great screen; well connected.
✗	Limited PIM support; price.
Verdict	●●●●○

palmOne Treo 600



If not for the stumpy antenna in the top left corner and the integrated thumb-sized keyboard, the palmOne Treo 600 could pass for an everyday Palm device. Like Q2's Xda II, it takes the classic PDA form factor and adds mobile phone capability to it.

The chunky feel of the 600 takes some getting used to — the larger form factor isn't as convenient as the phone-based devices.

That said, the integration between PDA and phone is well executed. When the phone button is pressed, a colour-coded section of the keyboard can be used to dial numbers. In SMS or PDA mode, the keyboard reverts to the standard QWERTY format for easy text entry.

The Treo is comfortable in the hand but feels more like a conventional phone than a mobile handset. However, as it ships with a wired, mono hands-free kit, the unit can stay in your bag or pocket during calls. GPRS and infra-red connectivity options are all present, but sadly, no Bluetooth.

The Treo is disappointing in startup tests, taking 40 seconds to dial a number and one minute and 10 seconds to read a SIM — the slowest in the line-up.

Desktop connectivity is achieved via a USB sync cable that must be connected to an external power supply for charging. The Palm Desktop synchronisation software has support for Outlook. Support for other PIMs is possible but requires the purchase of third-party solutions.

Details

Contact	palmOne
Phone	(02) 9844 5420
Online	www.palmone.com.au
Price	\$1,149
✓	Nice screen, PIM support.
✗	External antenna.
Verdict	●●●●○

Motorola A925



Motorola's A925 packs a lot of features into a hefty package, and its screen makes it a visually stunning device. But the cost of that size is its limited portability. You'll need pretty big pockets to carry this beast about, and the provided slipcase is rudimentary — it doesn't even have a belt clip.

On the upside, there are plenty of accessories supplied with the A925. It comes with a cradle that can be used to charge and sync the device with a PC and also recharge the second battery. A 32MB memory card adds to the 8MB of onboard RAM and there's a set of stereo headphones that perform double duty as a wired headset.

The software on this Smartphone is a bit of a mixed bag. The note taker application works well

and lets users store sketches and text easily. The onscreen keyboard is easy-to-use, but is too small for anything other than a quick note. The handwriting recognition software is so painfully slow that we gave up using it.

The A925 takes one minute and one second to read the SIM card, about average for this group, and a laggardly 49 seconds to dial a phone number — the second slowest in this test.

The bundled software allows easy synchronisation with both Outlook and Lotus Notes by USB cradle and wirelessly with either infra-red or Bluetooth.

The A925 is trying to be all things to all people, but it doesn't quite hit the spot.

Details

Contact	Motorola
Phone	(02) 9882 8900
Online	www.motorola.com.au
Price	\$768 plus \$50 connection fee
✓	Nice screen; price.
✗	Size; complicated data input.
Verdict	●●●●○

Motorola MPx200



The Motorola MPx200 is a great piece of hardware. With its dual screen and clam shell style, this Smartphone is easy to set up, use and run. Motorola has dished out a mobile phone with plenty of PIM functionality, without making it too complex to use.

When closed, the slick black casing looks great. The small, greyscale, external LCD with blue backlighting is great for screening incoming calls. A nice leatherette case complete with a swivelling belt clip is supplied.

Be aware that the MPx200 is running an older version of the Windows Mobile OS. Like the other Smartphones running Windows Mobile, this device can sync to Outlook but other PIMs will require extra software.

Synchronisation is by USB cable only. In fact, one of the great things about this phone is that the sync cable charges the phone without the need for

an external power supply when it's connected to a PC. The MPx200's most significant shortcoming is the lack of Bluetooth.

Like other devices of its vintage, the MPx200 has 32MB of RAM and ROM. It also has an SD memory slot so users can carry their own content or install other applications without sacrificing system memory.

The MPx200 is the slowest device in the roundup for dialling phone numbers, taking a whopping 50 seconds. It takes one minute and three seconds to read a SIM — about average.

This phone could read all the contacts from the test SIM, but it cut off the last couple of digits from the phone numbers, making them unusable.

Details

Contact	Motorola
Phone	(02) 9882 8900
Online	www.motorola.com.au
Price	\$849
✓	Nice screen; expandable memory.
✗	Old operating system; no Bluetooth; issues reading some SIMs.
Verdict	●●●●○

Nokia 6600



The Nokia 6600 is a mobile phone first and a PDA second. Although it's wider than many mobile phones, its tapered shape fits easily in the hand and is comfortable to hold. However, the number pad lacks sensitivity and the closeness of the buttons takes some getting used to.

By having a slightly larger footprint, the 6600 is able to hold a generous screen for a device in this form factor. The display is very clear, with great depth of colour and 176 x 208 pixel resolution. This is important as the Symbian operating system requires a good screen for easy navigation.

As well as GSM and GPRS connectivity, the 6600 has an easy-to-use Bluetooth stack and

infra-red. Using Bluetooth, it's possible to connect to a PC and sync to Outlook and Lotus Notes with the bundled software. Nokia also includes a trial version of Ulead's Photo Explorer 8 for touching up pictures taken with the integrated VGA camera.

The 6MB of built-in memory can be expanded by adding MMC memory. However, the phone must be turned off and battery removed to expose the memory slot.

The 6600 takes 45 seconds to read the SIM, second only to its sibling, the N-Gage. It takes 34 seconds to dial a number — slightly faster than average, but still not great.

If you want a fully-featured mobile phone with a few simple, well-executed PDA functions, the Nokia 6600 may be the ideal Smartphone for you.

Details

Contact	Nokia
Phone	1300 366 733
Online	www.nokia.com.au
Price	\$899
✓	Bundled software; PIM support.
✗	Poor keypad; memory slot placement.
Verdict	●●●●○

Nokia N-Gage



The Nokia N-Gage is truly one of a kind. While every other device in this line-up is a combination of a phone and PDA, the Nokia N-Gage is a handheld gaming console that also functions as a phone and PDA.

Multiplayer games over the internet using GPRS or Bluetooth bring out the best in the N-Gage.

Designed for two-handed operation, the keypad on the right doubles up as the numeric keypad and extra game controls. On the left are buttons similar to those on a standard games console controller.

N-Gage games are stored in a specially encrypted format on multimedia cards. While there are a few games available, the most

notable being Tony Hawk's Pro Skater, support is still pretty thin on the ground. Gameplay is fun on the N-Gage thanks to the unit's responsive joystick and well-placed buttons.

Using this device as a phone is, well, a little weird. It needs to be gripped on its curved side while the straight side is held next to the user's ear.

The N-Gage is one of the speediest devices in startup tests — 19 seconds to dial a number and 35 seconds to read the SIM — less than half the time of some rivals.

Multimedia performance is not brilliant. With Real Player built in, content from a myriad of providers can be viewed and downloaded. If the screen were comparable to a Gameboy Advance, this device would be far more exciting.

Details

Contact	Nokia
Phone	1300 366 733
Online	www.n-gage.com
Price	\$599
✓	Well connected; good gaming controls.
✗	Unusual shape; small screen for gaming.
Verdict	●●●●○

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Sony Ericsson P900

The Sony Ericsson P900's most noticeable feature is its screen—it's big, and at a resolution of 208 x 320 pixels, exceptionally clear. Although the display is similar to the Motorola A925, the unit is substantially smaller overall and far more attractive than its most direct competitor.

With the flip-over keypad open, the P900's Symbian operating system runs in full-screen mode. When closed, the contents of the screen resize so that nothing is lost. But rather than just making everything smaller, all the onscreen elements are cleverly rearranged to fit the smaller screen. It even automatically turns off the onscreen keypad when the flip cover is closed.

Another nice surprise is that the keypad is removable. Once it's off, the supplied stylus



can be used to input data. Although the numeric keypad's buttons are an unusual shape, users will have no trouble dialing with them.

With its cradle and the bundled software, PC connectivity is simple and the bundled software will please corporate users, with support for both Microsoft Outlook and Lotus Notes. The onboard cache of 16MB of RAM is plenty for storing diary entries, tasks and contact details. Infra-red connectivity is lacking, though Bluetooth, GSM and GPRS are all supported.

The P900 takes 29 seconds to dial a number and one minute and five seconds to read a SIM.

Overall, this is a nice device. It has great usability, with a responsive OS and simple controls. It is well-engineered and the large screen is attractive. However, its price tag may deter some.

Details

Contact	Sony Ericsson
Phone	1300 650 050
Online	www.sonyericsson.com.au
Price	\$1,689
✓	Great screen; PIM support.
✗	Price.
Verdict	●●●○

Sony Ericsson T630

The Sony Ericsson T630 looks just like a standard mobile phone. But dig a little deeper and you'll be handsomely rewarded.

Despite its blocky shape, it fits nicely in the hand and sits comfortably while using it as a standard phone handset. The user interface is easy to navigate, but the frosted effect on the buttons detracts from the total usability of the phone as people with poor eyesight might find the numbers difficult to read.

Desktop synchronisation to Outlook is available, but no sync cable is supplied. Alternatively, integrated Bluetooth can be used with an appropriately-equipped PC.

Connection to the Internet is simple. The Online button kicks off a GPRS connection (if supported by your ISP). The crisp display

makes doing such activities as reading online news and looking at pictures as pleasing as they can get at this size.

The cleverly thought out placement of the camera's "Shoot" button allows you to turn the device on its side and use it like a conventional point-and-click camera. This feature clearly shows Sony Ericsson's attention to usability.

With a rated battery life of 13 hours' talk time, the best thing about this device is that it just keeps on going. It's pretty speedy too. The T630 takes just 16 seconds to dial a number—the fastest in this group. It takes 45 seconds to read the SIM, equal second with the Nokia 6600.

The T630 is recommended for phone fiends who want a little extra functionality.

Details

Contact	Sony Ericsson
Phone	1300 650 050
Online	www.sonyericsson.com.au
Price	\$860
✓	Battery life; well-integrated camera.
✗	Confusing keypad.
Verdict	●●●○



Smartphone specifications

Model	02 Xda ii	02 Xphone/i-mate Smartphone2	palmOne Treo 600	Motorola A925	Motorola MP280	Nokia 6600	Nokia N-Gage	Sony Ericsson P900	Sony Ericsson T630
Size (h x w x d, cm)	13 x 7 x 1.9	12.4 x 5.1 x 2.4	11.2 x 6 x 2.2	14.8 x 6 x 2.4	8.9 x 4.8 x 2.7	10.8 x 5.8 x 2.4	7 x 13.4 x 2	11.5 x 5.7 x 2.4	10.2 x 4.3 x 1.7
Weight with battery (g)	190	130	168	210	118	125	137	150	92.5
Screen size (cm)	5.5 x 7.5	3.5 x 4.5	4.7 x 4.7	4.2 x 6.3	3.5 x 4.5	3.5 x 4.2	3.5 x 4.2	4 x 6.1	3.1 x 3.8
Resolution (pixels)	240 x 320	176 x 220	160 x 160	208 x 320	176 x 220	176 x 208	176 x 208	208 x 320	128 x 160
Colours	64,000	64,000	4,000	64,000	64,000	64,000	4,000	64,000	64,000
Memory	128	32 MB	32 (24 user accessible)	12	10	6	4	16	N/A
Built-in (MB)		64MB ROM							
Expansion	SD/MMC	SD/MMC	SD/MMC	SD/MMC	SD/MMC	MMC	MMC for games	Memory Stick Pro	N/A
Connectivity	900/1,800/1,900	900/1,800/1,900	850/900/1,800/1,900	900/1,800/1,900	900/1,800/1,900	900/1,800/1,900	900/1,800/1,900	900/1,800/1,900	900/1,800/1,900
Battery									
Standby (hrs)	150	75	240	70	70	200	200	400	312
Talk time (hrs)	3.5	3	6	1.5	3.4	3	4	13	16
Desktop connectivity	Desktop cradle	USB cable	USB cable	Cradle	USB cable	N/A	USB cable	Desktop cradle	N/A
PIM support (supported)	Outlook	Outlook	Outlook	Outlook, Lotus Notes	Outlook	Outlook	SyncML	Outlook, Lotus Notes	Outlook
Camera	640 x 480	640 x 480	640 x 460	640 x 480	No	640 x 460	No	640 x 480	288 x 352

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2 Belkin NE-07 Notebook Bag

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3 Belkin NE-10 Notebook Trolley

This bag's top-loading design makes it easy to access gear, and has two removable mini-cases for a PDA or mobile phone. \$159.95; www.belkin.com/anz

4 Targus XL Notebook Backpack

A 17in laptop can easily fit in this beast, as well as other assorted gadgets. \$119; www.targus.com/au

5 Targus Air Notepad Plus

This bag's air protection system will keep your notebook safe. \$129; www.targus.com/au

6 Belkin NE-SC and NE-SC2 Notebook Slip Cases

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7 STM cocoon

Protect your iPod with this designer carry-pouch, complete with drawstrings and ear bud pocket. \$49.95; www.standarddtm.com.au

8 Crumpler School Hymn

Tailored for G4 Powerbooks, these satchels are hard on the outside but have a soft inner lining. Available in three sizes. From \$90; www.crumpler.com.au

9 Crumpler John Thursday 60

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10 Targus Sportline Deluxe Backpack

This backpack's features speak for themselves — heavy duty fabrics, nylon webbing and a weatherproof flap. \$149; www.targus.com/au

11 Crumpler Cripply Dock

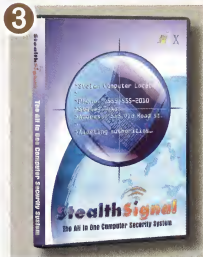
It has a protective seal to stop water and dust, and fits a 15in laptop. \$165; www.crumpler.com.au

12 Crumpler McBain's Lovechild

This over-the-shoulder bag has an adjustable strap, waterproof lining and is available in three sizes (up to a 15in notebook). From \$75; www.crumpler.com.au

13 STM dock

The clear PVC shell slips over your PDA, and its velcro strip holds the sturdy outer case in place. \$49.95; www.standarddtm.com.au



Accessories

1 Belkin Wireless Optical Mini Mouse

Belkin claims this mouse can be used on almost any surface — we'll believe it when we see it. \$69.95; www.belkin.com/anz

2 Targus USB 2.0 4-Port Hub

A high-speed hub to connect all of your gadgets to your PC via USB. \$99.95; www.targus.com/au

3 StealthSignal XTool Computer Tracker

This hidden software emits an online signal for Stealth's team to trace your notebook's whereabouts. \$65 per year; www.stealthsignal.com

4 Belkin Quadra Pen

It's a pen, a stylus (pointer for PDAs), a laser pointer, an LED light, and an ear cleaner. Okay, scratch that last one. \$29.95; www.belkin.com/anz



6 Kensington Portable Universal Docking Station

This mini USB 2.0 device includes ports to connect a keyboard, USB device, mouse, printer and Ethernet network access. \$249; www.accoast.com.au



8 Kensington Wi-Fi Finder

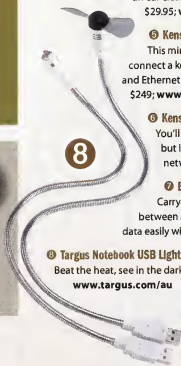
You'll attract a few stares waving this around, but it's a great way find a good wireless network signal. \$49; www.accoast.com.au

9 Belkin USB 2.0 Flash Drive Memory 256MB

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Breakthrough technologies

Computing is about to forge a new cutting edge that includes faster CPUs, next-gen wireless and a fresh face for Windows. William Maher and Dan Warne report on how these upgrades will radically alter the shape of PCs to come.

Forget faster clock speeds and wider screens, research labs are now burning the midnight oil to re-engineer the entire PC with a wave of progressive technologies.

The end result? As well as packing more power, the vision for the next generation of desktop and notebooks is more ambitious than ever, including PCs that double as TV sets, DVDs that store 50GB, dual-core CPUs, notebooks you

can talk to, ultra high-speed wireless and cooler PC air-ducting designs.

Driving many of these technologies is a push by the likes of Intel and Microsoft to claw their way into the home entertainment market. New wireless speeds will give PCs better connectivity, while advances in magnetic and optical storage will make the PC a hub for TV, music and movies. Make no mistake, this is

more than just a technology battle, it's a fight for survival. "When you walk into Harvey Norman now, the PC dollar is competing with digital cameras, PDAs and MP3 players," points out Gartner analyst Andy Woo.

The good news is that there will be more choices for consumers: 64-bit or 32-bit, Windows XP or Microsoft's Media Center software, and an increasingly complicated array of new CPUs.

We've done the hard work for you by singling out the best of the new breed. All you have to do is read on to get the latest on the technology behind tomorrow's computers.

Intel's new power game

Speed-hungry consumers are pushing chip makers towards dual-core CPUs and dual-GPU graphics cards, but the biggest change isn't about speed.

Current trends indicate that if you can't make a technology any faster, double up on it. The IT industry has worked around speed problems by building dual-processor PCs and dual-channel RAM that effectively doubles the speed DDR offers at no extra cost.

Multiple CPUs within a CPU are set to be the next big thing. Both AMD and Intel are promising to ship dual-core processors next year, an upgrade to Intel's Hyper-Threading technology. AMD will be upgrading its Opteron processors, while Intel hasn't yet named its multi-core desktop processor.

But dual-processor PCs don't mean double the speed — they usually mean smoother multi-tasking and some speed improvement in the small number of applications that support multi-processing. Will multi-core CPUs work differently? We don't know yet, but Intel has one answer: it's about more than just bumping up speed. The company is promising users the ability to run two operating systems simultaneously. Linux and Windows, two different versions of Windows, or two copies of the same version of Windows — take your pick.

Intel's new technology, code-named Vanderpool, will rely on multiple CPU cores on a single die. But more importantly, it will implement virtualisation commands on a

hardware level. The makers of operating system virtualisation environments, VMware and VirtualPC, now have competition that they'll never be able to match with software.

The bad news is that Intel says it'll be five years before Vanderpool comes into production, though the company did demonstrate a working prototype at last year's Intel Developer Forum.

In the absence of Microsoft getting it together over security, chip-makers have started planning protection against the weakness most commonly exploited by virus writers: buffer overflows.

Viruses often use buffer overflows to overrun their allocated area of data memory to insert malicious executable code into

application memory. Virus programmers have found endless opportunities to exploit buffer overflows in Microsoft software. While Microsoft has systematically

squelched many of them, millions of PCs are running with unpatched versions of Windows, which is an ongoing headache for Microsoft's reputation.

AMD has announced its AMD64-based CPUs will start blocking buffer overflows on a CPU level — but only on PCs with Microsoft's upcoming Windows XP Service Pack 2 or

Intel has a hardware security plan, already shipped with Prescott CPUs

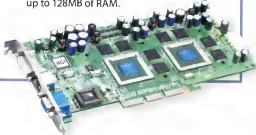
Graphics chipmakers think laterally

The hottest new graphics chipset this year won't come from Nvidia or ATI, but from lesser-known player XGI (formerly the multimedia product division of chip-maker SIS). Expected to land in Australia during the third quarter of this year, the XGI Volari will offer dual-processor rendering power with 512MB of GDDR2 RAM and up to 32GB/s of memory bandwidth.

XGI says it plans to be the worldwide GPU leader by 2007, and if its performance stats are true, its competitors will have a

hard time catching up. It claims 11.2GB/s for the 256-bit Duo V8 Ultra card with native DirectX 9 support.

For mobile users, ATI's Mobility Radeon 9700 chipset is a first for notebooks, offering the full performance of the 9700 desktop card in a more power-efficient chipset. It has up to 128MB of RAM.



The 64-bit question

If you feel like 64-bit CPUs are a lot of smoke and not much fire, you're not alone. But with Microsoft firming up its shipping dates for an x86-64 version of Windows ("second half of this year"), there's a sense that 64-bit computing and its touted "cinematic gaming experiences" may be just around the corner.

Intel's recent announcement that it would add 64-bit extensions to its server-grade Xeon CPU was a welcome backdown on its previous Itanium 64-bit strategy, which didn't offer any 32-bit backward compatibility. The Nocona Xeon chip will debut later this year at 3.6GHz, with an 800MHz frontside bus and 2MB of cache. It will be capable of running in pure 32- or 64-bit, or in a combination 32/64-bit modes.

So how long until we see it on the Pentium? Actually, 64-bit extensions are already there, if you own one of the Pentium 4 Extreme chips, and Intel says it will turn on the technology as soon as the market is ready. "We don't see the demand, and the software's not there [yet] either," an Intel spokesman told APC.

That might sound like an arrogant response, but AMD's Athlon 64 and Opteron chips, which offer 64-bit computing right now, won't have many compelling uses for the vast majority of people until a compatible version of Windows 64-bit is released.

Windows XP 64-bit Edition for 64-bit installed. The chips prevent programs from overrunning their allocated memory space with malicious code, which the computer can then be forced to execute.

Intel also has its own hardware security strategy under the moniker Le Grande, which has already shipped with its Prescott CPUs in a dormant state. Le Grande offers a wider array of protective functions than the AMD technology, including ways of processing keystrokes and mouse clicks that stymie sniffer software.

Inside info

Intel 64-bit extensions: www.intel.com/technology/64bitextensions/faq.htm

XGI Volari BitFluent architecture: www.xgi-tech.com/upload/42EBD467-AE63-43DB-8649-46E2B6B3FC7B/BitFluent.pdf

Data express

If you want to keep your PC up-to-date, prepare to rip the guts out of it:

Intel is fundamentally changing PC architecture, and it's about time.

PCI Express is riding on the popularity of video editing and high-definition video on the desktop. Bandwidth of up to 2Gbit/s through each of its two channels is almost twice as fast as existing AGP 8X slots with 2.1Gbit/s single channel throughput, and 15 times faster than the 133Mbit/s PCI bus, first introduced in 1992.

PCI Express solves the problems of both AGP and PCI. AGP is a single duplex standard only (data can only flow one way at a time). PCI is a shared bus with a relatively low maximum speed, so it can quickly become overloaded. PCI Express, on the other hand, is a full-duplex serial standard — data can flow to and from an ExpressCard both ways at once, and each card gets its own laneway to the I/O controller hub.

The data autobahn will first appear with Intel's Grantsdale and Alderwood chipsets, expected to ship in the next couple of months.

Considering current drives can't saturate even half of the 150MB/s Serial ATA specification, some are asking the question: is Serial ATA II (SATA2) a "standard without a cause"?

SATA2 offers more than a 300MB/s transfer rate: it makes SATA more suitable as an external drive connector, ushering in a range of external drives with multiple drive-mechanisms running in a RAID configuration that can make the most of its hefty bandwidth.

It features a new sturdier external plug format than SATA's original effort, and cable lengths longer than SATA's one metre limit are supported.

Native command queuing (NCQ) in SATA2 allows drive controllers to queue and re-order up to 32 requests to read or write to a drive. Much like a delivery driver sorts out the order of his run in the morning to avoid criss-crossing

town, command queuing can produce substantial efficiencies in reducing unnecessary head travel.

Wireless networking is about to become as common as Ethernet, with Intel integrating it straight into the new ICH6W southbridge on Grantsdale and Alderwood chipsets. Home users won't have to worry about what type of wireless access point they're connecting to either: the I/O controller hub will support 802.11a, b and g.

Intel hasn't made wireless compulsory: the base ICH6 southbridge doesn't include it. But with the cost differential expected to be very low between the base ICH chip and the wireless chip, wireless won't be a premium motherboard feature for long.

DDR2 is set to push memory speeds well beyond the current PC3700 (DDR466) limit. The DDR2-667 spec will top out at a staggering 10.6GB/s in a dual-DIMM configuration, 1.5 times faster than DDR466.

The performance boost is due largely to 4-bit prefetch, effectively allowing the I/O chipset to cache four times the amount of data that the data bus speed would normally allow. DDR has 2-bit prefetch. Its power consumption of 1.8V is also significantly less

No-compromise notebooks

The ultimate for mobile users is in sight: notebooks with next to no compromise in specifications and performance when compared to desktop platforms. Centrino 2004 is due for release mid-year (codenamed Sonoma) and will feature tri-band 802.11a, b and g wireless, and PCI Express, dual-channel DDR2 RAM and Serial ATA.

A new sound system (codenamed Azalia) replacing AC97 will offer high-definition 192KHz, 24-bit Dolby Digital 7.1 audio. It will also do away with the need to squint at the tiny engravings next to sound jacks on your notebook: plug a microphone or headphones into any jack and the sound chip will sense the impedance and correctly adjust the port for input or output.

than DDR's 2.5V, which will give notebooks a battery-life boost under the upcoming Centrino 2004 spec.

But DDR2 is no use without a new motherboard: it has 240 pins rather than 184. It also requires a Grantsdale or Alderwood controller chipset to work. If you're keen on buying the first Grantsdale boards on the market, be aware that some manufacturers are planning to ship early boards with DDR because of the high cost of the next-gen RAM.

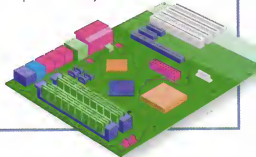
Motherboards go double-sided

Throw away your cases; bring out your dead PSUs. The venerable ATX motherboard form factor, cornerstone of PC design since 1996, is about to be killed off in favour of a next-generation board design.

The BTX (Balanced Technology Extended) motherboard is a direct response to the ever-increasing amounts of heat generated by modern PCs. Intel's new Hyper-Threading Prescott P4s, for example, dissipate a burning 103W of heat: vastly more than the Pentium Pro 200 chips that the ATX was designed to accommodate.

The new specification includes air ducting installed around the CPU. A single fan draws air over the CPU and spreads it to the other main heat-producing components

on the board. Stiffer PCB plastic and relocated mounting points make it possible for manufacturers to mount heat-producing components on both sides of the board. And while Intel is promising backward compatibility with existing ATX power supplies, it's also tempting users with the choice of a new BTX power supply with better power efficiency.



Inside info

BTX motherboards: www.formfactors.org/developer/specs/BTX_Specification%20v1.0a.pdf

SATA2 Native Command Queuing: www.serialata.org/about/pdf/Native%20Command%20Queuing%20Final.pdf

Life in the fast lane

Whether it's new wireless or supercharged cable LANs, network speeds and capabilities are being turned upside down.

Wireless LANs might represent the biggest PC networking breakthrough in years, but while the focus has been on 802.11a, b and g, much faster radio circuitry is on the way.

Dubbed UltraWideBand (UWB), the new technology has until now been relegated to niche status, dogged by competing specifications and government regulation issues. Now that's changing with the likes of Intel jumping on the new wireless technology for future products.

Essentially a high bandwidth, short distance radio tool, UWB could be the catalyst for the emergence of the long-discussed Personal Area Network. Instead of the 54MB/s and higher speeds of Wi-Fi, UWB operates in the range of hundreds of MB/s within a small zone.

Copper

breakthrough

Truly high speeds have eluded Ethernet users for more than three decades, but all that changed overnight with 10 Gigabit Ethernet. Scientists transporting black hole gravity wave data at the Lawrence Berkeley National Laboratory succeeded in achieving 10,000MB/s, or 10 billion bit/s — proving that humble Ethernet could step up to the big league in data speeds.

Transferring those lab speeds to garden variety PCs will rely on next generation Ethernet technology now in development. Among them is 10Gbase-T, which will allow 10Gbit speeds over twisted pair copper cabling, rather than expensive optic fiber. The technology promises distances of 100m over four-pair Class F (Cat 7) copper cabling, or between 55m and 100m on Cat 6. A standard should be ratified by mid-2006.

While over 34 companies are said to be involved in the 10Gbase-T project, backers are confident the technology will make the jump from million-dollar research labs to mere mortals. As a networking expert from Sun Microsystems pointed out: "Today's server is tomorrow's desktop."



► **Beam me up:** the coverage range of RF data communications.

The system relies on multiband digital pulses transmitted simultaneously across a wide range of radio channels, the major benefit being less interference. UWB is said to be more effective at penetrating through walls, though the trade-off is a shorter range than Wi-Fi.

The technology will make its mark on mainstream PC users in the form of wireless USB, which will initially hit 480MB/s but could eventually go as high as 1GB/s. For device-to-device connections, Intel is predicting range of about 10m, as opposed to more than 100m for Wi-Fi.

As well as relying on less than 0.5mW for power, Intel says wireless USB will have other methods of avoiding the battery drainage problems associated with radio processors. This will include sleep/wake states for the radio.

Talk tricks

PC owners have had the capacity to talk over the Net for nearly a decade, but now it's being built into the PC. Notebooks with Integrated Voice over Internet Protocol (VoIP) capabilities will appear in the next year, a momentous step for a technology previously regarded more as geek-tech than a mainstream communications tool.

Gigabit Ethernet and broadband networks are now more common and can cope with the extra traffic. Software companies are also becoming more adept at merging voice and data — Microsoft is making VoIP a key part of its vision for instant messaging and communications software, integrating voice chat alongside email and instant messages in its Real Time Communication Server.

The glue that will hold this all together is

Inside info

MultiBand OFDM: www.multibandofdm.org/ieee_proposal_spec.html

Wireless USB: <http://developer.intel.com/technology/ultrawideband/downloads/wirelessUSB.pdf>

VoIP: www.cisco.com/en/US/tech/tk652/tk701/tech_white_papers_list.html

SIP: www.ind.alcatel.com/library/white_papers/wp_SIP.pdf

10Gbit Ethernet: www.10gea.org/10GEA%20White%20Paper_0502.pdf

10GBASE-T: www.ieee802.org/3/10GBT/public/nov03/10GBASE-T_tutorial.pdf

The first completed specification is due this year, after which the first wireless USBs will appear in 2005, either embedded or as add-on cards (depending on government regulation). Intel hopes it will eventually replace wired networks in homes, which will require the technology to be integrated into CMOS chips.

With wireless USB, says Intel, you could walk up to a printer and beam across your files, or share scanners, printers and other peripherals at the drop of a hat. All this to do something that's already been tried with Bluetooth. So the concept is far from new, but the jury is still out on whether UWB will change the game.

the Session Initiation Protocol (SIP). Sitting in the application layer, SIP will find and connect callers and receivers. Name mapping means that sophisticated redirection is possible, such as automatically forwarding messages based on your location.

Programmers can code their own tricks, manipulating calls in the same way as any other IP traffic. Voicemail can be sent to email accounts, and calls can be placed by clicking open an Outlook address book (see page 28).

Intel's new Florence prototype notebook incorporates a built-in phone handset. In addition, some Centrino notebooks in 2005 will begin to incorporate Extended Mobile Architecture (EMA), which includes a small display on the outside of the lid for call data and Outlook functions.

The new face of Windows

Love it or hate it, Microsoft's Media Center is on its way. But will it really change the face of computing?

Expected to arrive in Australia late this year, Windows XP Media Center Edition is Microsoft's first major effort to re-orientate Windows around home entertainment.

While it's hard not to see this as an attempt to cash in on the incredible popularity of DVDs, the truth is that the software represents much more. CPU speed is no longer a sure-fire sales play; there is now an industry-wide shift to breathe new life into the PC as a consumer moneymaker. If the hype is to be believed, PC vendors such as Dell, HP and Acer could move into the same realm as DVD and television brands such as Sony and LG.

Designed for TV-capable PCs, Media Center allows PCs to act as a DVD playback centre and sophisticated electronic VCR, recording TV programs to the hard drive and allowing viewers to pause and rewind broadcasts via remote control.

At the core of the system is the Media Center interface, which runs in a resizable window on top of Windows XP Professional. From here users can access electronic program guides, set recording times and download music and video.

Microsoft has chosen a new file format called DVR-MS, which is an MPEG-2 file including metadata about the recorded

program. If you're planning on recording a lot of TV, make sure your hard drive is up to the task; disk space per hour of recording ranges from 1GB to 3GB, depending on quality.

It's not possible to change this format for recorded TV or to edit these files, although third-party DVR-MS conversion tools will be available. Copy protection will also limit the playback of some recordings to PC only.

Media Center PCs connected to home theatre systems are capable of Dolby Digital, DTS or PCM surround decoding. Nvidia is also building PCI cards designed specifically for the Media Center, including a TV tuner with MPEG-2 encoding.

The biggest challenge Microsoft faces is making the PC act more like a regular

appliance. Instant-on modes will allow the Media Center to wake from a standby mode to record scheduled shows, while buffering makes it possible to press rewind

on the remote while watching live TV, or to pause the action for up to 30 minutes.

Melding PC and broadcast technology is not for the faint-hearted, and beta testers have so far encountered numerous teething problems, not least of which is the complexity of configuring PCs for broadcast technology. For this reason Microsoft has chosen to only offer Windows XP Media Center Edition with new PCs, not as separate software.

That said, it's clear that the home entertainment push has galvanised manufacturers — more than 40 PC makers in the US are shipping Media Center PCs. In addition, there are already various non-Microsoft Media Center systems appearing incorporating exciting new designs, such as the DVD player-like Hush PC, Acer's all-in-one Aspire, and Altec's mini Digide. Says Altec's Scott Emerton, "It's a niche market, but it's very important. I think it's only going to grow, because so many big companies are pushing it."

Melding PC and broadcast technology is not for the faint-hearted



► Too cool: Media Center brings set-top box functionality to Windows.

Longhorn's inner magic

Arguably the most revolutionary part of the next version of Windows (aka Longhorn), the Windows File System (WinFS) has the potential to revolutionise the way Windows PCs make sense of rapidly growing masses of data regardless of file type.

If early tests are anything to go by, the new WinFS storage system is certainly ambitious — beta versions caused PCs to grind to a halt under sheer CPU load.

Extending the conventional NTFS file system, WinFS provides a common search mechanism for files regardless of application type. Instead of application data stored in separate stacks, the system acts as a central relational database, relying on XML metadata to describe files. This means that users will be able to search across all files based on properties such as author or title.

Technology like this has been touted as the basis for radical new versions of Windows as far back as 1992 with Microsoft's abandoned Object File System, but the idea has so far been unseen in Windows.

Screenshots on Microsoft's site indicate that although physical folders will still exist in Longhorn, users won't rely on them. Instead they'll use a sophisticated GUI to sort and search for files. Rather than viewing files in the order they are stored on the hard drive, WinFS shows dynamic "sets" of data based on user's search criteria. This also includes email, Web pages and memos.

In Longhorn it will be possible to store files either in WinFS or on NTFS — the new system is simply an advanced capability for people wanting to search and share data more easily. The system will also be backward compatible; WinFS APIs can be able to access files stored in WinFS, and there will also be a new WinFS API.

Inside info

Media Center PC design: www.microsoft.com/whdc/hwdev/platform/mediacenter/default.aspx

Enthusiasts: www.xpmce.com

WinFS: <http://msdn.microsoft.com/Longhorn/understanding/pillars/WinFS/default.aspx>

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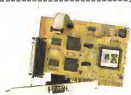
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The super discs

New storage technologies promise to smash Gigabyte barriers, but beware of a potential format war.

It's hard to imagine PCs capable of storing 1Terabyte of data, but that's the figure now being bandied around in manufacturers' labs as Microsoft and Intel salivate over the prospect of re-engineering PCs as "media centres". The race is on to build technology that's able to cope with space-hogging content such as television, digital camera footage and high-definition movies.

For big capacities the hard drive will still be king, but next-generation laser technology is pushing optical media to new heights. A new breed of high capacity optical formats that capitalise on the incredible popularity of DVD are now beginning to emerge.

The key to this capacity jump is short wavelength blue-violet lasers instead of the red lasers which are currently used to read 4.7GB discs. Blue lasers have a smaller focus area than traditional red lasers, meaning more data pits can be embedded in the disc surface. Those pits spiral out from the centre of the disc and are read by the laser pickup, which then decodes the reflected light from the pits.

Disc doctors

While next-generation DVD takes shape, magnetic hard drive storage experts are preparing for their own big technology breakthrough. The jump to 48-bit addressing has already cleared the 137GB barrier, taking the conceivable drive limits to 144Petabytes. But in the labs, the most excitement surrounds breakthroughs in the way magnetic particles are arranged on the disc platter.

Perpendicular recording makes it possible to cram up to 20 times more data onto each glass disc platter, achieving a storage density of 200GB per square inch. Magnetic particles are arranged vertically rather than head-to-tail, saving space and allowing more bits. Maxtor and Fujitsu, which are predicting 170GB on a 2.5in notebook platter, have developed prototypes.

Vendors including Sony and NEC have been working to shorten the wavelength of the laser and alter the shape of the pickup lens, resulting in a system that can accurately read discs with more data per square centimetre. Systems capable of reading 50GB per disc are already in development.

The Blu-ray format is one of two top contenders, and currently boasts 27GB per single disc layer or 50GB with dual layers (DVDs store data in several layers). This is enough for two hours of high-definition

video or 13 hours of television. Meanwhile, the rival NEC/Toshiba-backed HD-DVD format specifies 15GB on a single sided disc, with 32GB the goal for dual layers.

Data transfer rates of 36MB/s for Blu-ray also promise on-the-fly picture recording from television or digital cameras, with minimal quality loss. Phillips claims it will even be possible to edit digital camera footage on a disc while at the same time recording television footage, though we'll believe that when we see it.

Blue laser systems from both camps have already been demonstrated at industry trade shows, but there's a catch. Standard blue laser pickups won't read today's 4.7GB DVDs, a compatibility weakness that has thrown open the doors to claims from both camps that their technology is "The Future" — sound familiar?

FORMAT FIGHT

NEC and Toshiba have seized on this compatibility issue, producing a prototype drive with a single optical pickup combining a blue and red laser diode, ensuring compatibility with CD, DVD and HD-DVD.

An LSI chipset that combines a servo controller, data signal chip and ATA/PI interface has also been developed, bringing commercial production of HD-DVD drives a step closer. In addition, read-only and rewritable versions of



► Blu-ray disc: a shorter laser wavelength will increase disc capacity.

the HD-DVD format have received approval from the DVD Forum, an industry body comprised of DVD drive manufacturers.

That said, the DVD Forum's approval is by no means a guarantee of HD-DVD's future. Rewritable DVD standards were a debacle, so we're sceptical about a smooth transition to the new formats, all vendor claims aside.

Consider who's lining up on the other side of the fence and the picture clouds further. While NEC and Toshiba are driving HD-DVD, there are at least nine major Blu-ray backers including Sony, Hitachi, LG, Mitsubishi, Pioneer, Philips, Samsung, Sharp and Thomson, as well as PC vendors HP and Dell. Panasonic, Philips and Sony have demonstrated prototypes, while Sony is already selling blue laser systems to homes in Japan.

Read-only and rewritable formats are in development, and Matsushita has already launched what it claims is the world's first dual-layer blue laser drive in Japan. The very fact the two camps have decided to compete, not cooperate, means someone thinks this is going to be big. Let's just hope the discs work. **BTTC**

Inside info

Blu-ray: www.blu-ray-disc-official.org/tcinfo/index.html

Perpendicular recording: www.hgst.com/hdd/research/recording_head/pr

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WORKSHOP

Hands-on with hardware and software, plus bonus CD content

130 Create a system image

In the first of a three-part series, *Serdar Yegulalp* explains the preliminaries of system imaging to deploy Windows to multiple machines.



134 Optimising Windows XP page file

As *Bert Smith* explains, when it comes to the Windows XP page file, it's not size that matters but what you do with it.



136 Setting up a search engine

Whether you're running a large Web site, or your own personal page, a search engine will bolster its usefulness. *Dave Carter* explains.



140 Online communities, part 2

Now that your community is up and running, it's time to get your members interacting. *Jarrod Spiga* explores forums, polls and newsletters.



142 Configuring a soundcard in Linux

Have you been hearing the noise about the Advanced Linux Audio Architecture in the new kernel 2.6 for Linux? *Andrew Lau* brings out your inner audiophile.



144 SmoothWall firewall

Nick Race shows you how to protect your computer or network from casual access using a tailor-made Linux distro.



148 Installing TrackBack

Keeping track of Web site postings and blog entries is easy with TrackBack 1.1. *David Emberton* puts you on the right path.



150 Realsoft 3D

Realsoft 3D takes simple geometric shapes and builds them into complex structures. But as *Vesa Meskanen* explains, it's not as difficult as it sounds.



154 Norman Privacy 3.0

Protecting data is as important for the home user as in business. *David Emberton* unlocks the secrets of Norman Privacy.



Site of the month

www.driverheaven.net

Drivers are the bane of any PC enthusiast's existence, and gamers go to extreme lengths to ensure they're getting top performance out of their hardware by upgrading regularly. Seeking out new or updated drivers on a weekly basis can be a pain, but *DriverHeaven.net* provides download links for the current versions for Nvidia and ATI cards, and also outdated drivers.



APC relies heavily on this site for sourcing older driver kits. Anyone who takes gaming seriously will be no stranger to the tweaked Omega and Cyborg driver packages. These are both available for download at *DriverHeaven.net*, along with a catalogue of reviews and features geared towards system performance, overclocking and tweaking your system for optimum computing.

Bonus CD software

Most Workshop articles are accompanied by bonus software loaded onto our cover CD set — just look for this icon. This is often software that's integral to the article. The selection ranges from full-working versions and trial versions to shareware and freeware.

APC cannot provide tech support for these programs, but if you have a problem with the CD itself, by all means holler our way (see page 8 for details on how to contact our CD team).



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Improving your image

In the first of a three-part series, Serdar Yegulalp explains the preliminaries of using a system image to deploy Windows to multiple machines.

Installing Windows on one machine is easy enough. But what about installing it on 10, 20, or 50 machines? When faced with a task of that size, the traditional approach of booting the CD and running Windows setup is enough to drive anyone to distraction.

This is where system imaging comes in handy — the ability to create an installation of Windows and copy it bit-for-bit to one, five, 10 or 100 other computers. The actual installation and setup only needs to take place once, on a single machine that's representative of all the others. The rest can be highly automated, involving little more than distributing a boot floppy and/or a CD or DVD to all the target machines.

In this three-part Workshop, the work involved in creating, deploying and administering a Windows system image for multiple desktops will be discussed. This first instalment looks at preparing the hardware, software and operating system for the installation; the second part will discuss creating and deploying the image; and the third will deal with what to do after the image is in place.

SYSTEM BUILDING AND PLANNING

The first step to creating a good image is to build a first-class system. Doing this one system at a time isn't that hard, but for a whole network of PCs it's a lot more complicated. However, using homogenous hardware for your newly-deployed machines cuts out a lot of the variables that can pop up during this process.

HARDWARE AND DRIVERS

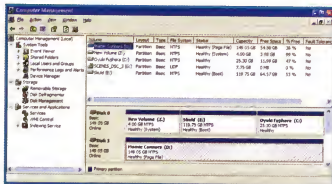
For the most part, bleeding-edge hardware won't offer native driver support in Windows. If you're thinking about outfitting your systems with the latest video card, make sure you also have the driver to go with it. Often Windows can find the next best thing — an unaccelerated video driver that supports high resolutions and refresh rates, but it probably won't work at full speed. As soon as a user tries to do something remotely demanding, the driver may not be able to support it.

Drivers for controllers integrated onto motherboards are another troublesome issue. Some video controllers may be based on certain chipsets (the Nvidia GeForce4, for example), but they will only work properly with drivers provided by the motherboard or PC manufacturer. This can also happen with network controllers — incorrect controller drivers can appear to work at first, but unpredictable behaviour (such as randomly dropped links and poor network performance) may surface later.

Of all the integrated hardware that can cause problems for an automated deployment, motherboard-based USB controllers are one of the worst offenders. Some claim to be USB 2.0 compliant and

Bonus CD software

BootIt Next Generation
1.61a; New SID/
SIDChanger 4.0.



Big problems: hard drives with partitions over 137GB (like the two shown above) can pose problems in system imaging if the target systems haven't been tested to accommodate partitions of that size.

aren't, while others have poor support for certain devices. As with other integrated devices, they often require their own drivers as generic ones aren't always well-behaved.

The best results usually come from name-brand controllers using name-brand chipset controllers. These are broadly compatible with generic drivers and hardware, so if you're stuck with a given set of motherboards, you can add new USB controllers and disable the old ones. Many hardware and driver problems can be thwarted by thoroughly testing a system before using it to build the deployment image, as well as taking notes about what does and doesn't work.

BIOS

From the time a system ships to the moment it's actually up and running, a great many things can change — especially the system's BIOS or firmware. Last-minute changes to a system's BIOS can fix problems that might otherwise persist through setup and duplication, long after the system is already in place. This is another reason to use as many identical machines as possible when performing mass deployments. Make a habit of checking for firmware updates for the machines to be used, both before and after the deployment period.

HARD DISKS

Hard disks larger than 137GB may have trouble booting on some systems. In many cases, the system may not be able to make use of the whole disk, due to quirks in the way large disks are addressed in BIOS. You may need to perform a BIOS update (if available) to work with large disks properly.

Another variant on this quirk can show up if you're using a pre-built disk image more than 137GB in size. If, when the image is unpacked, the boot files are too far out on the disk for BIOS to address them, the imaged disk won't boot correctly. This results in spurious crash errors about missing boot files or even bad disks.

► **Spirited imaging:** Symantec Ghost is the de facto standard for system cloning and imaging.

OPERATING SYSTEM

The first thing to do is get the most up-to-date copy of the operating system(s) you plan to deploy. Most commercially available versions of Windows 2000 or Windows XP, for instance, ship with some level of service pack preinstalled.

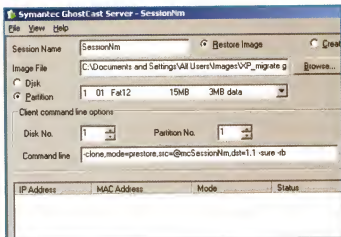
If you're working from a commercial copy of the product, or the only media you have on hand is an RTM (Release to Manufacturing) version of the OS, it's possible to download service packs and post-SP hotfixes and "slipstream" them into the installation media. This process is a little complex, but it ensures you have the most recent version of the OS before you start imaging. It also saves time as the updates don't have to be downloaded and installed — after the copy of the operating system is organised, everything else can be set up in one go. For more about slipstreaming service packs and hotfixes into a Windows CD, check out www.betaplace.co.uk/ssp1.asp. Having an up-to-date OS image is also helpful if you plan on distributing a copy of the OS itself (aside from the system image) to each workstation.

SINGLE VERSUS DUAL PROCESSOR

What if you're deploying on a batch of machines where some are single-processor and some are dual-processor? When installed, Windows 2000 and Windows XP Professional determine which hardware abstraction layer (HAL) to use for that machine — the regular, single-CPU HAL or a HAL designed for symmetric multiprocessing (SMP). The standard HAL only supports one processor, and Windows can't automatically shift from a one- to two-processor HAL. This means some decisions have to be made about how to handle machines that need SMP images. (Note: Windows XP Home doesn't support multiple processors.)

There are a few possible approaches:

- 1 Build separate images for single- and dual-processor machines. This is probably the safest approach, although it requires twice the amount of work. But if you need reliable dual-processor support for specific machines, this is the smartest way to do it. And take the time to do it right.
- 2 Manually reconfigure dual-processor computers, once imaged, to use the proper HAL. This is tricky, but it can be done in both Windows 2000 and XP by changing the HAL in the Device Manager (see [http://support.microsoft.com/default.aspx?scid=kb;\[LN\];234558](http://support.microsoft.com/default.aspx?scid=kb;[LN];234558) for the procedure). Unfortunately, this means that it has to be done by hand on each machine that needs it, as it's not really a scriptable process. If you're dealing with more than one or two machines, it's probably worth building a separate SMP system image.
- 3 Use an SMP image on all machines. If most of your machines are SMP and you only have a few single-processor machines, this might work. A dual-processor HAL can work seamlessly with a single processor. But this may be overkill, and there's the possibility of other hardware inconsistencies between dual- and single-CPU machines.



SYSPREP AND GUIDS

Globally Unique Identifiers (GUIDs) are the system-specific ID numbers generated for every installation of Windows. To avoid having duplicate machine GUIDs in an organisation, the administrator can use the SYSPREP tool to prepare a system to automatically regenerate a GUID after the image is deployed and booted on the target machine. SYSPREP is widely used by OEMs — indeed many of the system images created for commercial PCs are SYSPREP-packaged installations. For a complete rundown on how to use SYSPREP, see www.microsoft.com/windowsxp/pro/using/itpro/deploying/introduction.asp. This should be the last step in the preparation of the PC before the image is built.

If you're using Microsoft's Systems Management Server (SMS) 2.0, you can work around the need for duplicate GUIDs with a technique described in Microsoft's Knowledge Base ([http://support.microsoft.com/default.aspx?scid=kb;\[LN\];257808](http://support.microsoft.com/default.aspx?scid=kb;[LN];257808)). Because of the way GUIDs work in Active Directory, it's not possible to clone domain controllers (as opposed to simple standalone servers) with system imaging. Domain controllers have to be installed from scratch to work properly.

If you're stuck with a machine that has a redundant GUID, the SIDChanger tool from Sysinternals (www.sysinternals.com/ntw2k/source/newsid.shtml) can create a new GUID for the machine without forcing a reinstall or the hassle of running SYSPREP.

XP in bulk

If there are two words that make the flesh of Windows administrators crawl, it's Product Activation (PA). Reviled by users and admins alike, PA is unfortunately here to stay, but that doesn't mean you have to live with it through the process of setting up Windows XP on multiple machines. If you're dealing with 10 or more workstations and want to save yourself a lot of hassle, spring for the bulk-licensed, pre-activated version of Windows XP. This is a special edition of XP, identical in every way to the commercial version except that it comes pre-activated from the factory. Obviously, you need to buy a corresponding number of site licences for each workstation, even if you only need one physical copy of the media. For more about bulk-licensing Windows XP or other Microsoft programs (such as Office), see www.microsoft.com/licensing/resources/default.mspx.

SOFTWARE

After setting up the OS on the image system, the next step should be determining what software, if any, to package with the system image. This can be done over the network through a server push or from a bulk-copied CD, via the standard installation program or via an MSI package. The exact mechanism is up to the administrator (unless the program requires a specific installation modality).

The key to deciding whether to set up a given package before or after the imaging process is personalisation, and should be considered on an app-by-app basis. If a given application needs user-specific information to work correctly, it's best installed after the imaging process. Adobe Photoshop, for instance, needs very little in the way of personalisation. Its settings, including the plug-ins installed with it, can be preconfigured as part of the system image. A program such as Netscape, on the other hand, requires user-specific information — email addresses, POP3 servers, and so on — which varies from user to user. Such software should be set up as part of the post-configuration process after the image has been deployed.

DEPLOYMENT METHODS

Another critical area that requires plenty of forward planning is the method used to get the image out to all of your target systems. This partially hinges on what you're using to perform the deployment (for example, SMS, third-party program or hardware devices), and also on the geography of the deployment. For instance, if you have 20 computers in-house, and 20 remote users on laptops, the local systems could be imaged relatively easily across the network, but the remote systems would probably be best done by burning and mailing CDs or DVDs.

NETWORK

Beaming a system image across a network is enormously convenient, but it's not without its pitfalls. In the best possible scenario, there's nothing that needs to be physically brought to the machine in question (except maybe a boot floppy to initiate the imaging process), and the whole process is almost entirely hands-free. Unfortunately, sending a system image across a network connection isn't always the best idea, especially if the image in question is several gigabytes in size and other people are using the same bandwidth. Some imaging applications (such as Symantec Ghost) allow for bandwidth throttling over wide-area networks — convenient for "trickling" an image across a network when time isn't of the essence.

CD/DVD/TAPE

If the image is relatively small (less than 5GB compressed for a single DVD), it can be copied to a DVD-ROM (or even CD-ROM) and unpacked on the target system with the aid of a utility, most often booted from a floppy disk. This is one of the best all-around methods for a variety of reasons: It works with just about every system configuration, since virtually every PC now comes standard with a DVD drive; blank DVD/CD media are cheap and durable (often less than \$2 each when bought in bulk); and images on DVD can be posted and are often a lot faster and less cumbersome than trying to broadcast an image of the same size across a wide-area network. And since one disc can image a slew of systems, it can be saved and re-used in the event of a disaster.

If the imaging software supports spanning across multiple pieces of physical media, a large disk image can be broken across multiple DVDs. Some imaging programs also support imaging directly to or from tape devices, although the exact devices supported vary from program to program. Many of them support QIC/ATAPI tape drives, for instance, but few seem to support DLT.

PRE-IMAGED HARD DRIVES

Copy the image directly from the computer to one or more hard drives, which are then installed in the target computer(s). This can be done by setting up a PC as a copying master and then plugging in one drive after another, or by using a dedicated disk-duplication system like those offered by Intelligent Computer Solutions (www.ics-iq.com). Direct-to-drive imaging is probably the fastest way to do system imaging, but it's also the most expensive (especially if you don't already have a disk duplication system), and many administrators balk at the idea of removing, imaging, and then reinstalling hard drives across many systems. For this reason, it's probably the worst choice for remote users. It's not the best choice for imaging to laptops either, as removing and replacing a hard drive on a laptop is often complicated.

THIRD-PARTY PRODUCTS FOR IMAGING

Aside from Microsoft's SMS, there are a range of third-party products that perform system imaging. The prices on these packages can vary enormously, as well as the feature sets.

Symantec Ghost Corporate Edition (www.symantec.com.au)

The granddaddy of system imaging programs, Symantec purchased Ghost from Binary Research a few years ago and it has since been expanded to support a whole range of hardware and interfaces. One of the best things about Ghost is that it allows the administrator to continue administering the deployment even after the system's set up. One way to do this is by automatically rolling out patches and upgrades as needed if the target systems are configured to accept them. Norton Ghost 2003 is a stripped-down version of the program, designed for individual users than departments, but can still be useful for non-automated deployments.

Altiris Deployment System

(www.altiris.com/products/deploymentsol)

Altiris's main product for imaging, Deployment Solution is part of a larger suite of client and system management products that have tight integration with Active Directory. If money is no object, this may be the best choice since it provides a great deployment solution and a solid platform for future upgrades and maintenance.

BootIt Next Generation (www.terabyteunlimited.com)

BootIt Next Generation is a powerful, self-contained program that fits on a single floppy and performs a huge number of disk and partition imaging functions, including non-destructive moving and resizing of partitions. The program works with IEEE1394/USB 2.0 drives and traditional IDE and SCSI drives, supports large hard drives (2TB) and partitions (1 to 2TB), and can image directly to or from CD-R/RW or DVD±R/RW. It doesn't support imaging over a network, but it's an ideal solution if you're doing all your system imaging via CDs or DVDs on a limited budget. **BT**



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Peak performance

As Bert Smith explains, when it comes to the Windows XP page file, it's not size that matters but what you do with it.

The Windows page file, `pagefile.sys`, is absolutely crucial to Windows' operation. It temporarily holds data that would otherwise be held in memory in order to free RAM up for other applications. `Pagefile.sys` is created when Windows XP is installed and is stored by default in the root of the partition containing the operating system. Without `pagefile.sys`, some software won't run, hardware can malfunction and "out of memory" errors can appear on boot up.

If it's too small, the problems mentioned above can occur and XP's performance can become lethargic due to significant disk activity (thrashing). If `pagefile.sys` is too large, it wastes disk space and can cause file fragmentation.

Using the NTFS file system, full control must be given to the system for the root directory where `pagefile.sys` is located. If you don't, the "unable to create a page file" message appears on boot up.

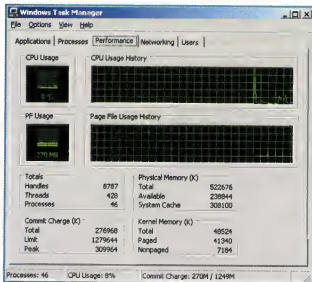
The first step towards optimising your page file is to figure out how much space it should occupy. There is vigorous debate about the size, placement and the necessity of a page file. However, one size doesn't fit all in this situation.

Log on to your computer with administrator privileges and follow these steps to find the locations and sizes of your page files. Go to Control Panel > Performance and Maintenance > System. In System Properties, click on the Advanced tab and under Performance, click Settings. On the Advanced tab under Virtual memory, click Change in Performance Options. The Virtual Memory dialog box opens with the details of the page files on your system and their locations. This is also the place to make changes to your page file settings if you want to resize or move them to another disk.

OPTIMUM SIZE

Opinions differ widely for the page file size. Microsoft suggests that the recommended minimum size of your page file should equal about one and a half times the amount of your physical RAM (<http://support.microsoft.com/default.aspx?scid=kb;en-us;308417>). It also recommends that a maximum size is about four and a half times the quantity of the physical RAM you have installed. A system with 512MB of RAM would therefore be around 768MB, with a maximum of 2,304MB. The default size of the virtual memory paging file Windows creates during installation is one and a half times the amount of RAM on your computer.

Obviously, a larger page file is required for the optimum performance of a system that has plenty of RAM, but this is a contentious issue. In his account of virtual memory, Microsoft MVP Alex Nichol states that the file should be around two and a half times the amount of RAM you have installed (www.aumha.org/win5/axpvm.htm). But what about those with large amounts of RAM (1GB and above)? Few applications call for 1GB of RAM, so surely a



► **Taking Windows to task:** the Windows Task Manager is a hidden source of much useful information.

machine with a huge store of RAM can get away with a tiny page file (or none at all)? Afraid not. Some applications refuse to launch if there's no page file present on the disk.

Some experts recommend setting the page file to be dynamically sized, but this can slow the disk system down and lead to extra file fragmentation. Others recommend setting the maximum and minimum sizes to the same number, so Windows is locked into using a page file of a specific size. Unfortunately, Microsoft has suggested that this hampers rather than improves performance (www.microsoft.com/WindowsXP/expertzone/columns/mcfedries/03june16.asp).

TASK MANAGER

The best way to choose your page file size is by doing a little digging. XP's Task Manager is useful for finding the optimum size for your page files. To do this, load up the applications you usually have running at any one time, adding one or two more for good measure. Right-click the Task Bar, select Task Manager and then choose the Performance tab. There are four number boxes at the bottom of the window, labelled Totals, Physical Memory, Commit Charge and Kernel Memory. Keeping the Commit Charge peak well below the value of the installed RAM reduces the need for the page file and makes additional RAM available for the system cache.

Keep an eye on the difference between the Commit Charge and Physical Memory totals. This should be as large as possible. This box also displays the amount of page file usage. If this is a single, flat line, then the system is accessing the page file minimally and your system is fine as it is. A deeper, more thorough test involves building your own page file monitor.

► **Console yourself:** the best way to troubleshoot your system is to build your own monitoring tool.

CUSTOM CONSOLE

It's easy to create a custom page file monitor that can run over several days to log data, enabling you to optimise your page file. There's also a free Visual Basic program available from Microsoft MVP Doug Knox's Web site, www.dougknox.com/xp/utlts/xp_pagefilemon.htm.

To build your own, follow these basic steps. Click on the Start menu and open the Run box. Type `mmc` into the box and click OK. From the MMC console, click File > Add/Remove Snap-In > Add and the ActiveX Wizard will open. Select ActiveX Component > Add > Next and set the Control category drop down menu to All Categories. Under Control Type, select System Monitor Control > Next. At this point you'll be prompted to name your monitor: "Paging File Monitor" is a sensible choice. After you've named it, click Finish > Close > OK.

Now you have a snap-in which you can add counters to and monitor. In the right-hand pane of the console, click the + sign in the top row to open the Add Counters dialog box. From here, choose Select counters from computer. Under the Performance object heading, select all counters and select instances from the list. Click Add > Close. This is all you need to do to create the monitor. From here you can drag a shortcut of the snap-in to the desktop to launch the monitor.

Before using it, fire up the apps you usually run, plus one or two that you only use occasionally. To log the data your Paging File Monitor collects, right-click the top bar on the right-hand page, select Properties, choose Source and check the Log files radio button. Text file comma delimited (csv) is a convenient file type. Ensure the log has started before continuing.

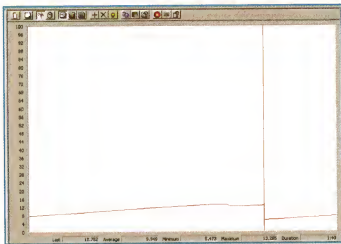
After a few days, open the log file with Notepad or Excel. Look for the highest value shown on the far right of each log, and round it up to the nearest whole number. Get the average for all the logs — they're in percentages.

To obtain a suggested initial page size value, divide your average by 100 and multiply it by the size of your current page file in megabytes. To be on the safe side, and to prevent running out of virtual memory, add approximately 40% to the value of your calculated figure to work out the ideal page file size.

PLACING THE PAGE FILE

Consider whether you want a small kernel or complete memory dump formed in the event of a system crash. If you do, a page file must be created on the partition where Windows XP is installed. A page file of fixed size is useful for this purpose. Using the utility `dmppch.exe` from the XP installation disc, analysis of `memory.dmp` can reveal the system state at the time of the crash. However, the results can be difficult to interpret and don't reveal the events leading up to the time of the crash.

Splitting a page file among multiple physical hard drives improves performance. But don't split it on multiple partitions on the same physical hard drive where Windows is installed. Windows uses a page file more aggressively if it's not located on the same physical hard drive as the XP installation. If you do this, make sure that the

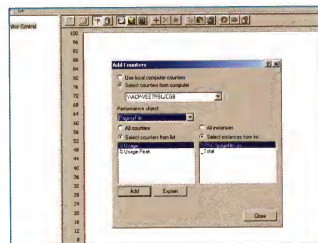


second hard drive is at least equal in performance. If you have only one hard drive, place the page file on the partition where Windows is installed. For the maximum size of your page file, try twice the initial size and monitor its performance for a week or so using your custom Page File Monitor. Try to keep the peak usage under 80%. This leaves a suitable safety margin for periods of unusually heavy use. A bit of experimentation is well worth the time and trouble.

DEFRAGGING PAGE FILES

XP's built-in disk defragmenter is a cut-down version of Executive Software's Diskeeper and has some severe limitations — for one, it can't even defrag a page file. A small performance gain can be obtained if the page file is defragmented, so having a dedicated drive/partition for the page file is attractive.

Some commercial applications, like Defrag for Windows 1.0 (featured on cover CD 1 of APC March), can defrag the page file, but make sure you back it up before doing so. A fragmented page file substantially hampers performance, so it's a good idea to defrag them at least once a month. While paying special attention to your page file isn't the be-all and end-all of memory tweaking, sensible and considered settings will ensure your machine can run at full tilt when the going gets tough. [LTTT](#)



► **Power tools:** if you scratch Windows' surface, secret utilities like MMC snap-ins enable you to construct useful tools.



Start your engine!

Whether you're running a large site for a company or your own corner of the Web, a search engine will bolster its usefulness. **Dave Carter** explains.

With billions of Web pages and mountains of data stored in online repositories, it's vital to include a search facility on all but the most basic of sites. Although Google offers a site search feature, building your own simple search engine is a more rewarding option.

Google's site search allows you to restrict searches to a single domain, in effect providing a search engine for your site. Simply add **'site:curls'** to either the beginning or end of your search query. For instance, the query for a search of "Python" on www.apcmag.com would look like this:

python site:apcmag.com

What is needed now is a form on your own page that allows users to search your site without having to head over to Google. A simple HTML form will do the trick. Here is an example which keeps search results limited to www.apcmag.com:

```
<form action="http://www.google.com/search" method="GET">
Search APC:
<input type="hidden" name="q" value="site:apcmag.com">
<input name="q" size="30">
<input type="submit" name="submit" value="Search">
</form>
```

The **'site:curls'** option is passed to Google as a hidden input value. This ensures the search is always on the selected domain rather than the entire Internet, so the user doesn't have to enter the option every time. Google requires no other special values, just the query itself.

Now that a quick solution is up and running, it's time to begin the more difficult task of writing a search engine in Python.

THE WAY OF THE SEARCH ENGINE

A simple search engine can be broken down into three main components which work independently of each other. These components are:

- The spider — which scans documents for important information.
- The indexer — which takes the information retrieved by the spider and builds a searchable index.
- The query engine — which handles the user's query, returning documents found in the index.

All three components are vital to the search engine.

As the project can be broken into these three distinct sections, it's easy to tackle each section separately. This way, good modular code can be developed and re-used for similar projects further down the track.

Bonus CD software

Search Engine,
sample code files.



► **Google it:** although Google can be used to search most sites on the Web, it's more professional to build your own search engine.

THE SPIDER

When searching, the spider starts with a base URL, then finds links to other pages plus information for ranking the page in a query. The spider is only responsible for grabbing the page data. As this can be a long process, all other unrelated functions should be moved elsewhere to keep it working as quickly as possible.

Once the spider has retrieved the raw data, we must decide what the important data is and what it will be used for. Stripping the HTML tags now is a bad idea if the title, meta tags or any other headings are required. This data is very useful in determining what the page is about and what the key words are. However, "important data" could be anything which distinguishes this page from others on the domain, so be sure to take all elements of the page into account.

Important data needs to be retained and refined for analysis by the indexer. All the spider should do is store the information on each page in its raw state, leaving the refinement up to the indexer. In the example code on this month's cover CD set is a "document" class which provides various functions for cleaning, analysing and saving the data from each page. For each page the spider grabs, it creates a new document to represent that page and adds it to a list of documents which it will eventually pass to the indexer.

When building the spider, make sure any links the spider tries to open are valid by checking the extension of the link. We only want to read files containing some kind of text, such as HTML files and TXT files. PHP files can be problematic because they can contain either pure code or text. Image files, JavaScript files and anything else that meaningful data can't be extracted from should be ignored.

Relative links pose a similar problem. Some links will point to things like "python/index.html" without a domain. This means the spider will need to keep track of the domain of the page where it found the link and add it to the front.

Frames, as well as the picky nature of Python's `urllib` module, are two other problems you may encounter. Frames are fairly simple to overcome — configure the spider so it looks for frame tags and retrieves the source file as a link.

Python's `urllib` module requires that the link it is opening has the protocol at the beginning (`http://`). Check that each link has the protocol at the beginning or an error will occur.

PYTHON IN PRACTICE

Now that the general theory is out of the way, let's look at the sample code on the cover CD. The code for the spider is in the file `spider.py`, and the document class is in `document.py`. The spider also acts as a "driver" for the other modules, so numerous other modules are imported before anything else.

Most of the work is done in the spider class, with a few helper functions defined for odd jobs. The `init` method of the spider class begins with the creation of a few instance variables. Variables are needed to keep track of the current domain, the list of valid domains, URLs that still need to be analysed, URLs that have already been analysed, the Document classes created by the spider and URLs that couldn't be opened.

A Python dictionary has been used for a few of those items, but the choice of a dictionary over a list for variables like "seen", which keeps track of which URLs have been seen, may not be immediately obvious. With a variable like this, it is only necessary to check if it contains a word or string. For instance, either we've seen "www.python.org" or we haven't. To check a list for a particular item, you need to look over the items it contains until they're found or you hit the end. This can be a time-consuming process, especially if the list is huge. With a dictionary, you can use the `has_key()` method to look up various items, and it returns true or false whether the item is in the list. This is a time-saving design choice.

Begin the spidering process by opening up the `seeds.txt` file, which contains the URLs to start searching with, and loading them into a list of URLs that need to be opened and analysed called "todo". Then the `spider()` method is called, which continues to call the `get()` method until the "todo" list is empty.

The `get()` method pops a URL from `todo` and reads the data from the page. Assuming the URL opens successfully, it gets the links on the page (if any) and checks each link is valid, that it is on the list of valid domains and that it hasn't already been found. If this process is successful, it then adds it to the `todo` list. Next it creates a new document instance with the data from the page and adds it to the list of documents.

When this is completed for every item in the `todo` list, a list of document objects is created, each with a unique ID and URL. These are written to a file with the `pickle` module in case any separate part of the system needs to access it later on.

THE INDEXER

The indexer has a lot less work to do than the spider. The bulk of its work is in building the database for the user to search on. In the

process, it needs to take out common words from the page data such as "the", "to", "in", and so on, and compare them with the data on a "stop list" of words to be ignored.

The reason for not indexing these words is primarily a matter of database size. Every English language page on the Web contains the word "the" and adding every single one to the index would be absurd. Not only that, but a search on the word "the" would be fruitless, since the user would get back every page on the Web.

There are two ways to build this database. One would be to use a database module, such as `anydbm` in Python's case, or a third party module such as `MySQLdb` to make use of MySQL databases. The other way is to create an "inverted file", similar to a Python dictionary. It uses the words found in the page data for keys, and the pages at which the key occurs for values. So, if the word `python` appears on pages 15 and 32, the entry for `python` would look like this:

```
"python": [15, 32]
```

Using a database is faster than an inverted file, though an inverted file is guaranteed to work, no matter what platform the code runs on.

The indexer expects the page data it is given has been cleaned up. That is, that any escape characters such as " " have been removed, and all unwanted white space has been removed. So before an index can be created, the data retrieved by the spider must be cleaned.

CLEANING

Cleaning involves removing escape characters, unwanted white space and also checking that all characters are alphanumeric. This is a fairly simple process. Python's regular expression module (`re`) allows us to compile regular expression patterns and substitute empty strings for the strings we want to replace.

The accompanying code contains a module specifically for this cleaning step in the search engine, called `cleaner.py`. It consists of two functions. The first is `clean()`, which takes the body of a page to clean, removes special characters, and then calls the other function of the module: `clean_words()`. `Clean_words()` goes through every word in the document, converts it to lower case and removes non-alphanumeric characters. The cleaned page is then returned and ready to work with.

THE INDEXER PART II

Now the data is clean, you can start building an index. The inverted file method is used in the accompanying code to avoid reliance on third party modules and platform specifics.

The indexer first creates a few instance variables. Two of them are stop lists — lists of words and characters not to index — and the other is the index itself, a Python dictionary. This is all the `init` method does. Other than this method, the class has an `addentry()` method and a `pickleindex()` method.

The `addentry()` method works by taking the URL number (a unique integer value that can be used to identify this specific

document), the meta tags of the document being processed, and the body of the document. Both the meta tags and body have been cleaned by the cleaner module, and so are ready to add to the index. It then sets a variable "pos", which represents the word's position in the document, to 0. This variable is used later to rank pages.

For every word in the meta tags list and page body list, the indexer checks whether the word is in either of the stop lists (character stop list or word stop list). If the word isn't in either, it checks if the word is already present in the index. If it isn't, the indexer creates a new entry in the index, which contains the unique URL number, a flag value to indicate whether or not the word is part of a meta tag description, and a list of the pages on which the word occurs. If the word is already in the index, the indexer adds the current page to the list of pages on which the word occurs.

After all this has been completed, the index is created. All that's left to do now is to store the index on the hard drive, which is done with the `pickleindex()` method. This method just dumps the index to a file using the pickle module. There is no need to provide a method to load the index back into the indexer class, as it doesn't need to use the data after this point.

THE QUERY ENGINE

The next step is querying the index. The query engine has the potential to be one of the most complicated aspects of the search system. This is because the query engine takes input from the user, which it must parse and extract the correct information from. It is also the most flexible.

Some example problems are the use of quotation marks and full stops. The computer doesn't differentiate between single and double quotation marks, but where they are placed is important. Keep them in the case of apostrophes, but remove them when they're surrounding a word, like "test". The simple option is to remove them all, but other methods to remove them based on context can be developed.

The problem with full stops occurs with abbreviations, such as A.B.C., where the full stops are used to separate the individual characters. It can be difficult to determine whether they should be removed, and whether the last full stop (after the character C in the example) should be taken as one denoting the end of a sentence or not.

"Stemming" words is another interesting feature. Stemming a word involves removing endings such as "s", "ing" and "ed". This enables searches for words similar to that of the user's input, and obtains a wider range of results for users to choose from.

Whichever method is used, ensure that the indexer and query engine perform the same operations on the data. As long as they're doing the same thing, the user will get some results when performing a search. The accompanying code takes the easy way out on these problems.

Another feature you may want to implement is the use of the logical operators AND, OR and NOT. This adds a lot more power to your query engine, allowing users to refine their searches that little bit more. The query engine should assume that the logical operator OR has been used if no specific operator is present, so it's just a matter of getting the AND and NOT operators working.

The query engine on the cover CD, `query.py`, implements the three logical operators. The script consists of numerous functions to apply the logical operators to the user's query, and alters the results returned accordingly. These functions are fairly self-explanatory.



► **Logical choice:** many sites, like www.logilab.org, rely on Python-based search engines to deliver fast, efficient search data for readers.

Excluding the logical operators as well as the language parsing will leave you with a very simple yet functional query engine. This delivers speedy results, and makes the implementation of a query engine easy, though it means accuracy is sacrificed.

THE USER INTERFACE

The user interface consists of two main components, input and output. The input is a simple form similar to the HTML form used in the first example. The output needs to retrieve results from a search of the index, and then at least display links to the pages returned from the user's query.

There are a few nice things you can add to the results page, just to spice it up a bit. An excerpt from the area of the page containing the query string gives the user an idea of the content in which the query is being used. An indication of file type and size is always a good idea, so users know exactly what they are pointing their browsers at.

One more important feature is a ranking system. It should ensure that the best match for a particular search query is displayed first. The ranking system won't be able to give the best results all the time, so it's important to design a method of finding the best results most of the time.

The simplest way to rank a page is to count the number of times the user's query words appear on it. Checking whether the word was in the meta tag list, or if the word was a title or heading, and awarding more points to the page for such occurrences can expand on this method. This opens up methods of exploiting the search engine, namely spamming a page with a single word to get the rank up. For instance, someone might repeat the word "computer" at the bottom of the page in a font colour that renders it invisible on the page's background. The user would never know it was there (unless they highlighted it), but the page's rank would increase dramatically.

Perhaps the greatest thing about Google is that it returns results very quickly. If your results page is bogged down with fancy graphics and complicated features, the page will take longer to load.

The sample files on the cover CD include a display page, `display.cgi`, which should get you started with some design and feature choices. [ETTC](#)

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Creating an online community, part 2

Now that your site is up and running, it's time to get your members talking to each other. **Jarrod Spiga** sets up forums, polls and newsletters.

Whether you're running a social club or a Web site, getting people interacting with each other is vital. PHP Nuke has several tools designed to assist community interaction, including a discussion forum, surveys, newsletters, private messaging system and personal journals.

The free-to-use phpBB forum software (www.phpbb.com) has been customised and ported to PHP Nuke so that both share database information. This allows members to use a single login for both the main site and your forum. Also, certain aspects of your home page remain visible to visitors when using the forum. Unfortunately, this means that you can't update phpBB when a new version is released, but you can look out for patches on the Nuke Cops site (www.nukecops.com) or wait for updated versions of PHP Nuke.

FORUM CONFIGURATION

By default, the forum is disabled. To activate it, log in to the Administration Menu (<http://<domain name>/admin.php>) then click Activate in the Forums row. Since survey setup is explained later in this Workshop, also activate the Surveys module while you're there.

Configuring the forum is fairly straightforward. To access the phpBB Administration pages, go to Forums, then Configuration located on the left under the General Admin heading. From here, you can customise the forum for use with your site. Pay attention to the following notes about some of the fields:

- **Script path:** this should always be `/modules/Forums/`, unless you've hacked your installation of PHP Nuke.
- **Disable board:** It's probably a good idea to disable the forum during setup. This prevents others from viewing or posting in the forum while you're configuring. Temporarily enable your board from time to time so you can preview the changes you've made. Unfortunately, phpBB doesn't allow users to view the board as an administrator when it's disabled.
- **Enable account activation:** this setting is redundant, as PHP Nuke handles all account maintenance. Regardless of what this is set to, users will still be able to access the forum.
- **Enable GZip compression:** when GZip compression is enabled, the Web server compresses data before sending it to the client. HTML code compresses very well, but having GZip enabled adds a slight performance overhead. To activate this, check that the ZLIB library is installed on your server. Don't activate this if `mod_gzip` is already running, since this module is already compressing data. You can check whether these are running or not by using the `phpinfo()` script (see APC April, page 112).

With this option enabled, data leaving the server will only be

General Configuration

The form below will allow you to customise all the general board options. For User and Forum configurations use the links on the left hand side.

General Board Settings	
Domain name	<input type="text" value="www.themepbb.com"/>
Server Port	<input type="text" value="80"/>
The port your server is running on, usually 80. Only change if different	
Script path	<input type="text" value="/modules/Forum/"/>
The path where phpBB is located relative to the domain name	
Site name	<input type="text" value="The Internet is a place"/>
Site description	
<input type="text" value="The main purpose of this site is to demo"/>	
Disable board	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
This will mean the board will be available to users. Administrators are able to access the Administration Panel while the board is disabled.	
Enable account activation	<input type="checkbox"/> None <input checked="" type="checkbox"/> User <input checked="" type="checkbox"/> Admin
User email via board	
<input type="checkbox"/> Enabled <input checked="" type="checkbox"/> Disabled	
Number of seconds a user must wait between posts	
Post Interval	<input type="text" value="30"/>
Topics Per Page	<input type="text" value="25"/>
Posts Per Page	<input type="text" value="25"/>
Posts for Popular Threshold	<input type="text" value="25"/>
Default Style	<input type="text" value="Sublime"/>
Override user style	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Default Language	<input type="text" value="English"/>

► **Configuration conundrum:** your forum will lack functionality without the proper settings.

compressed if the Web browser loading the pages supports GZip compression and is HTTP 1.1-compliant. More than 99.99% of browsers fall into this category.

- **Cookie domain:** this should be set to the domain on which you want the cookie to have effect. In most cases, you'll want this to take effect over the whole domain, so set it to your domain name (without the www). If you change it after this time, your users may have difficulty logging in.
 - **Cookie name:** this can be set to whatever you like. If you are running another instance of phpBB, make it unique to this instance.
 - **Cookie path:** If you run more than one forum on the same domain, set this to the individual directories of the forums. In most cases, leave it as a forward slash (/). It isn't a good idea to change this after you've set it, and make sure the path always ends in a forward slash.
 - **COPPA fax number and COPPA mailing address:** the *Children's Online Privacy Protection Act* (COPPA) was enacted in the US in April 2000 and applies to the collection of information from people under the age of 13. It specifies that Web site operators must provide privacy policies, when and how to seek parental consent on behalf of the child, and the responsibilities the operator has in protecting their privacy.
- If your site is targeted at people under 13 years of age or contains content this age group would be interested in, you could be violating US law by not complying with this act. For more information, see www.ftc.gov/bcp/online/pubs/buspubs/coppa.htm.

► **Vox populi:** surveys let you see how many people hold a particular opinion.

Survey

How are you using the "Building an Online Community" workshop series?

- ☐ Using it step-by-step to build my own community.
- ☐ Using the info, but jumping ahead to get hands-on.
- ☐ Reading the workshop, but doing my own thing.
- ☐ Reading the workshop, but not making a site.
- ☐ Not reading the workshop.

A BIT OF SUB-DIVIDING

Now it's time to create the locations for posting discussion threads. To assist with navigation, related forums are grouped in categories, and any number of categories can be created.

The phpBB discussion forum initially comes with a completely clean slate. Before you can set up a forum, a category must be created. To do so, click on the Management link, found under the Forum Admin heading in the left pane.

The key to a successful forum is to set a location aside for core topic areas and balance them with generic subjects. This works well because people like to chat. Without generic areas to balance serious discussion, threads can be hijacked by irrelevant and off-topic discussion. Generic forums may also attract visitors who wouldn't otherwise get involved in core discussion.

Navigation also needs to be considered. Naturally the core categories and most popular forums should appear at the top of the page. The display order of both categories and forums can be adjusted using the Forum Management tool.

Often, discussion boards have forums with custom permissions. Set broad level permissions on your forums by clicking on the Permissions link under the Forum Admin heading. Remember basic security principles — deny access generally, then grant access to the specific groups or users who should have access.

There are two methods for setting permissions. Simple mode uses predetermined settings on that forum. Its default setting is Public, and allows any visitor — whether logged into the site or not — to view and reply to posts and threads.

We recommend using the Registered setting (or tighter permissions) on every forum. Under this setting everyone can view threads, but only logged in users can reply. This is recommended because a forum is like a publication and any defamatory or other legally questionable information can be posted anonymously. If there's no proof of who posted the information, the publisher can end up in hot water.

Advanced configuration allows you to set more specific permissions, such as making certain forums invisible to classes of users, and defining who can make threads sticky (always appear at the top of the thread listing).

Setting forum permissions on a user's class is broad, so you should use group permissions to define more distinct levels of access. If a group doesn't have access to an aspect of a forum, you'll be given the option to override this permission.

Similar access definition can also be granted to individual users. The user permissions configuration screen is identical, though it uses effective access based on both forum level access and the access granted to each group that the user belongs to. After you've set your permissions, post an article on the main page advertising your forum to get the interaction started.

PRAETORIAN MANAGEMENT

It's inevitable that you'll come across disruptive or provocative users who seem determined to ruin the experience for everyone.

You can ban access via username, IP address, or email address. But be aware that banning the IP address of a proxy server can block a large number of visitors from your site. Many forum administrators configure their sites to ban all addresses from free email providers, such as Hotmail and Yahoo mail. The idea is that if a user gets banned, they can't resort to using a freshly created email account to re-register.

As your forum grows, consider delegating moderators. Moderators perform administrative functions and are often used to mediate disputes and online arguments. Assigning moderators is a double-edged sword — some may be draconian in their approach, while others may be too soft.

POLL THE POPULACE

Another way to get a community interacting is through an online survey or poll. Not only are they a simple and effective way to discover the views of those in your community, they can also be an interesting conversation point. Surveys appear by default on the right of the main page.

To set one up, go to the Administration Menu and click on Surveys/Polls. Enter the topic, set the options, and hit Create. You can also place a notice on the home page announcing a new poll and giving your members the opportunity to discuss it in the comments section.

Newsletters can also be used to notify people about site-specific events. To send one, simply click on the Newsletter link from the Administration Menu and complete the form. But please check your members' preferences before you send. Users can indicate in their profiles whether they want to receive newsletters or not, and it's courteous to heed their requests.

Other methods of interaction to consider include setting up an IRC channel, mailing lists and event organisation. PHP Nuke also offers a private messaging system and online journals — a way that members can keep a small blog on your site. [ETC](#)

Next month

Next month we'll focus on keeping your community running smoothly with database management and statistical monitoring. We'll also outline how you can customise your site.



Sounding off

Heard the noise about the Advanced Linux Sound Architecture in the new 2.6 Linux kernel? Andrew Lau brings out your inner Linux audiophile.

After nearly six years of development, the Advanced Linux Sound Architecture (ALSA) has reached an important milestone with its first stable release (1.0) being included as the default sound drivers in the 2.6 Linux kernel — heralded by some as the coming of age for Linux as a professional audio platform.

ALSA features include:

- Efficient support for all types of audio interfaces, from consumer soundcards to professional multichannel audio interfaces.
- Fully modularised sound drivers.
- SMP and thread-safe design.
- User space library to simplify application programming and provide higher level functionality.
- Support for the older OSS API, providing binary compatibility for most OSS programs.

IDENTIFYING YOUR SOUND CARD

As with most pieces of hardware under Linux, the brand and model name of the soundcard isn't as important as the chipset it uses. As usual, `lspci` proves helpful by listing all the PCI devices on your system. Here are two example outputs:

```
00:0d:0 Multimedia audio controller: Creative Labs SB
Audigy (rev 04)
00:1f:5 Multimedia audio controller: Intel Corp. 82801DB
AC'97 Audio Controller (rev 03)
```

The first `lspci` output is for an easily recognised Creative Sound Blaster Audigy, while the latter AC'97 identifier belongs to Intel's audio chipset that's commonly found in laptops and motherboards with integrated multimedia controllers.

Once you've identified your soundcard's chipset, look up its entry in the ALSA Soundcard Matrix at (www.alsa-project.org/alsa-doc). This database supplies details as to which chipset corresponds to which vendor's products and its compatibility with ALSA.

If you already have your soundcard auto-detected and working under the OSS/Free drivers, then `lsmod` (lists all loaded modules), `modinfo <module>` (query module details), and `dmesg` (diagnostic messages) can also provide helpful clues.

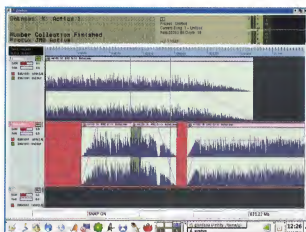
OBTAINING ALSA

The sources for `alsa-driver` are included in the 2.6 Linux kernel tarball, but can also be separately downloaded from (www.alsa-project.org). At time of writing, the stable ALSA release — 1.0.2c — was already included with the 2.6.3 kernel sources.

Any version of ALSA already merged within your kernel sources can be determined by viewing the `include/sound/version.h` file located within your kernel source. Note: even if you compile

Bonus CD software

ALSA Driver 1.0.3, ALSA
Firmware 1.0.3, ALSA
Library 1.0.3b, ALSA OSS
Compat. Library 1.0.3a, ALSA
Tools 1.0.3, ALSA Utilities 1.0.3,
alsa 1.3c3b, XMM5 1.2.10.



► Big league: ALSA natively supports many Linux applications, including Praetor, a free sound recording and mastering application.

the ALSA modules from within the kernel, you'll still need to obtain and install the corresponding versions of `alsa-lib` and `alsa-utils` separately.

You can navigate your way to ALSA setup through the following menu options: Device Drivers > Sound > Soundcard support > Advanced Linux Sound Architecture. For those compiling/upgrading your kernel source for the first time while switching to ALSA, see APC March, page 122.

It's essential to note that for ALSA to interact with your new kernel, you'll need to enable soundcard support regardless of whether you're compiling it within the compile process or separately. Apart from selecting to compile support for your soundcard from ISA, PCI or USB device subsections, there are a few other options that you should enable.

Sequencer support allows ALSA to process MIDI events from devices such as music keyboards. OSS API emulation is something all users should enable, as many legacy Linux programs have not yet been updated to natively work with ALSA. Finally, RTC Timer is an option provided for professional engineers who need an accurate timing source in their work.

It's also recommended that you elect to have all of the above compiled as modules instead of directly into the kernel, so that Linux can dynamically load and unload the ALSA drivers as needed. Once you've finished compiling your new kernel, don't forget to install the rest of the ALSA components.

SEPARATE COMPILE

The following section only applies to users compiling ALSA separately from the main kernel source. If you're not compiling a new kernel, and using your distribution's stock kernel, you'll most likely be required to install the corresponding kernel-headers (or source) package for your pre-existing kernel.

Start by extracting the source: `#` denotes that root privileges are



Smoothly does it

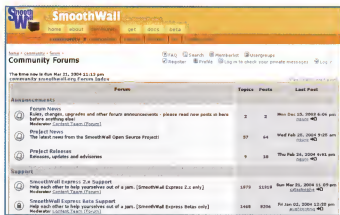
Nick Race fires up SmoothWall Express 2.0 and demonstrates how to protect your computer or network from attack.

SmoothWall Express 2.0 is a cutting edge firewall for small local area networks and individual PCs, developed as a free, open source initiative. Installed on a dedicated PC, SmoothWall Express can also act as a DHCP server to manage IP's on a network, provide network address translation (NAT) for sharing an Internet connection and a transparent Web cache to speed up frequently visited Web pages. SmoothWall is fully configurable and works by denying any incoming connections or data that aren't a result of an outgoing request.

An installation of SmoothWall Express requires a standalone PC with a minimum specification of a Pentium (150MHz minimum recommended), 64MB of RAM and a 540MB hard disk drive (2GB or higher is recommended to store log files or for utilising the Web proxy). Depending on the method of Internet access and type of ADSL or cable modem used, it may be necessary to have two network cards installed — one for connecting to the Internet via a modem (the "red", or untrusted card) and one for connection to a LAN (the "green", or trusted card). With the cost of network cards between \$20 and \$30 a small investment may be required, but with other popular firewall products costing around \$80 to \$110 for a single PC licence, the savings are considerable.

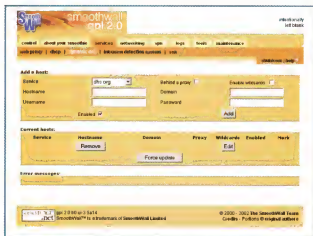
A SMOOTHWALL INSTALL

Installing SmoothWall Express is simple. Download the ISO from the SmoothWall Project Web site (www.smoothwall.org) or from this month's cover CD set, and burn the ISO to CD. The installation formats the hard disk and installs a limited Linux operating system, so you need to make sure that your important data is backed up.



► **SmoothWall's** the project's Web site includes useful online forums for community help.

Bonus CD software
SmoothWall Express 2.0.



► **Minimalism:** SmoothWall's Web interface is clean, simple and easy to use.

Boot the nominated machine with the SmoothWall Express installation disk and select the source of the installation files. Disk operation only takes a few moments.

At this point, we need to configure the green, or internal, network interface. The installation prompts to browse the system for a network card. Alternatively, select one manually from the list. Once a card is detected, the drivers will be installed and the green network card must be assigned an IP address. It's important to use either a 192.168.0.XXX or 10.0.0.XXX IP address, as these are reserved for use on private networks. We'll use 192.168.0.1 for the firewall. Use a standard network mask (255.255.255.0) for smaller networks to allow the unit to only talk to any PC on networks with IP addresses between 192.168.0.1 and 192.168.0.254. Once the IP address of the green network card is configured, SmoothWall installs itself on the hard drive.

SETTING UP THE BASICS

Select the keyboard type and hostname option from the menu, and give the firewall a name for accessing it once the setup is complete: "SmoothWall" is good enough for this purpose. For ISPs using Web proxies, enter the details in the proxy menu. Leave this blank if the Web proxy details are unknown — connection from the green network card still works, but SmoothWall may not be able to automatically update itself.

The next step is to configure ISDN. This is a rare connection method in Australia, so most will choose Disable ISDN in this menu.

If connecting with an ADSL modem via USB or a PCI card, select Device Type and choose the appropriate modem from the list of supported hardware. In the Other settings menu, input VPI (Virtual Path Identifier) at 8 and VCI (Virtual Circuit Identifier) as 35. This is standard for ADSL services in Australia. Select Enable ADSL and the ADSL configuration will be confirmed and activated. If connecting to an ISP via a router, or you don't use ADSL, select Disable DSL.

NETWORK CONFIGURATION

SmoothWall's connection to the Internet and a LAN should be configured in one of two ways. For USB or PCI ADSL modems, use a green network connection to the LAN and a red connection to the USB or PCI ADSL modem. For cable Internet or connection to DSL modem or router with an Ethernet cable, use a green connection to the LAN and red to the router/modem interface.

Choose the correct network configuration type. For the green + red option for cable Internet or routers, browse and detect the red Ethernet card in the Drivers and card assignments menu (as for the green interface).

Once the green and red interfaces are identified, go to the Address Settings menu. This steps you through the specified interfaces. The green interface was configured earlier, so all that's left to do is to choose how the ISP allocates IP addresses. For ADSL, select PPPoE to let the system dial up to obtain the information. For a router or cable modem, select DHCP to get an IP address automatically.

If using ADSL directly connected to the SmoothWall (USB or PCI connection), the ISP's DNS (primary and secondary) and default gateway IP addresses are required. (Consult the ISP's Web page or contact its helpdesk for the details). Enter these details in the DNS & Gateway settings menu. Cable users needn't do anything at this point — these details are obtained automatically on connection to the Internet.

By far the easiest way to manage a network of any size is by using DHCP to manage IP addresses and DNS information for client PCs. SmoothWall includes a fully-functional DHCP server to ease the burden of running a LAN. When the PC client is turned on, it obtains an IP address automatically from the DHCP server in SmoothWall and is immediately ready to access the Internet.

Select DHCP Server configuration from the Setup menu and enable the DHCP server. Choose a range of IP addresses to allocate to the PC clients. Enter the lowest IP address to be assigned in the Start Address field — anything above 192.168.0.1 is suitable. Then enter an end address higher than the number of clients on your network. The default 192.168.0.100 to 192.168.0.200 is more than adequate for a home network.

Set the primary DNS address for the client-accessible DNS servers. SmoothWall includes a DNS proxy, so set it to the same IP the green interface is set to (192.168.0.1). Leaving the Default and Maximum Lease Time and Domain Suffix fields as default will be adequate.


Finally, enter a password for the three main users of the system: "root" for gaining direct and unlimited access to the SmoothWall machine; "setup" for re-entering the setup menu used to configure the machine; and "admin" for logging in to the Web-based front end.

Once the passwords have been entered, SmoothWall restarts the computer. At this point, cable and router users have completed installation. It will function as soon as the restart has completed.

ADSL users with USB modems have one more step to complete before they're online. To finish the configuration, log in with the username "admin" and the password set in the previous step. Select the Networking tab and PPP settings tabs. Change the Interface in

the Telephony section to PPPoE, tick the Persistent Connection, Dial on Demand and Connect on SmoothWall restart boxes. Enter the ISP's username and password in the Authentication section and save changes. From the Control tab at the top of the screen, force a connection to the ISP.

UP AND RUNNING

Once SmoothWall has restarted, go to <http://smoothwall:81> from another PC on the network, the login screen for SmoothWall's Web-based front end. From here you can view traffic graphs and access logs, configure and enable intrusion detection, allow or deny certain hosts and ports and set up a Web proxy. 

Get SmoothWall working with Telstra BigPond Cable

A few extra steps are required to get your new SmoothWall working with Telstra's BigPond Advance Cable network. Unlike Optus' cable Internet service, BigPond requires a login program to access the Internet through its network. BigPond's login program authorises the user on the network, and responds to periodic "heartbeats" on the cable network to maintain the connection. As BigPond has not released an official client for Unix or Linux users, a group of studied hackers put together a working login client that works on most current operating systems. This software, BPALogin (<http://bpalogin.sourceforge.net>) has been updated by Matthew Frank to install and work with a SmoothWall setup.

Installation of the SmoothWall-compatible BPALogin program is performed after SmoothWall has been installed on the firewall PC. Once the system is up and running, remote SSH connections must be turned on through the Web front end to enable access to the SmoothWall's Linux operating system. Using an SSH client, connect to the SmoothWall box and login as root with the password specified in the initial setup. Transfer the SmoothWall compatible BPALogin script to the SmoothWall machine via the SSH connection, CD-ROM or floppy disk and unzip and untar the file into the root (/) directory.

Change to the /etc directory, and edit the bpalogin.conf file with the text editor joe, provided in the SmoothWall installation. Edit the username and password entries to reflect your real username and password on the BigPond network and save the file using Ctrl+k then x. Lastly, configure the script to start whenever SmoothWall is rebooted. Change to the /etc/rc.d directory and edit the rc.sysinit file with joe. Find the line containing /usr/local/bin/restartssh and directly underneath add the following line

```
/etc/rc.d/init.d/bpalogin.init start
```

Save and exit joe as before, restart your SmoothWall and you'll be surfing in no time. For a full explanation, complete instructions and the modified BPALogin script, visit Lucien Wells' Mini-HOWTO on SmoothWall Express and Telstra BigPond Cable at <http://users.bigpond.net.au/lwells/smoothwall/2.0-express/index.html>.



Off the beaten track

Keeping track of Web site postings and blog entries is easy with TrackBack 1.1. David Emberton gets you up and running.

Most Web sites and Web applications operate on simple client-server terms. TrackBack (TB) takes this a step further by enabling Web servers to interact with one another using pings. Several blogging systems offer TrackBack as an option, but it can also be used independently. Movable Type, Squishdot, Radio UserLand, pMachine, WordPress and others can all send and/or receive TrackBack pings.

To install the standalone version of TB, you'll need a Web host with CGI access, a recent version of Perl, and the following modules: File::Spec, Storable, CGI, CGI::Cookie and LWP. If you run your own HTTP server, grab these from the Comprehensive Perl Archive Network (www.cpan.org). Otherwise, have your admin install them for you.

CUSTOMISE AND INSTALL

Available from www.movabletype.org/trackback, the standalone package consists of a single Perl script and two text files: header.txt and footer.txt. The multi-modal tb.cgi can receive, send and display a list of incoming pings. Text files are used to customise the appearance of the receipt list, providing a place to put HTML. Regardless of whether you place anything in them, the script uses them automatically.

Ensure you have all the required Perl modules and the ability to run CGI scripts on your server. According to the documentation, all of the required files except LWP should be included with Perl 5.6.0.

Start by logging into your Web server by FTP, or by navigating to a Web-accessible folder on your PC. Create a new directory for storing incoming data, noting its location. Since TrackBack can also format recent inbound pings for syndication, you can create a directory for RSS feeds. Set permissions on these directories to 777.

Next, open up tb.cgi in a text editor and adjust these values:

What is PingBack?

PingBack (PB) is a competitive cousin of TrackBack. In a nutshell, where TB focuses on commenting, PB is all about linking. Whenever somebody links to your entry, they can send a PingBack to your site engine. This allows each page to have a list of related links commented within it. This, in theory, will grease the browsing process and create ad hoc Web rings.

Although it has many technical advantages over TB (it's a lot easier to implement), PingBack is less popular. This is due partly to the fact that it doesn't have the Movable Type juggernaut behind it, but also because it's less descriptive.

To get more information, read the PingBack 1.0 specification at www.hixie.ch/specs/pingback/pingback.

TrackBack at OSCON

The purpose of this page is to aggregate OSCON-related postings. If you're not familiar with TrackBack, it's a peer-to-peer communication framework between weblogs/web sites. In this case, it allows you to post an entry on your own blog, to notification of that entry appear transparently on this site. In this manner, we can provide a central resource of a tight entries regarding OSCON sessions/keynotes/etc. without much work on anyone's part.

The TrackBack implementation in Movable Type automatically generates RSS files for each section below, containing at the last 10 entries posted to each section. You can access the RSS files by clicking on the (RSS) link after each section.

If you're using Movable Type, and you have the bookmarklet installed, click on the bookmarklet while you're on <http://perl.oscon.com/oscon/>. In the popup window that appears, you'll get a list of sections to choose from: "Setup", "Keynotes", "General Discussion", etc. Select a section from the list, and when you post the entry on your own weblog, you will be added to that section on the page. Or, if you're posting often, associate the ping URL to a particular cat. Questions?

Sections (RSS)

State of the Python Union

Arnon Spector: The Writing: Posted on 07-24 at 10:52 AM

Python: Tutorials at OSCON

Arnon Spector: Tutorials: Posted on 07-24 at 12:02 PM

Perl: The Python Tutorials at Perl

Arnon Spector: Perl: Posted on 07-24 at 12:02 PM

► If you build it, they will ping: the OSCON conference sets up a TrackBack facility for blog-posting attendees.

```
my $DataDir = "/tb_data";
my $RSSDir = "/tb_rss";
my $GenerateRSS = 1;
my $Header = "/header.txt";
my $Footer = "/footer.txt";
my $Password = "foo";
```

`$DataDir` and `$RSSDir` are directories, relative to the anticipated location of tb.cgi. If you set `$GenerateRSS` to 0, you needn't worry about changing the `$RSSDir` setting — it won't be used. `$Header` and `$Footer` can remain as they are unless you specifically want to use other filenames. `$Password` should be changed to a combination of eight or more letters and numbers. The password can be stored inside the CGI file safely, assuming that the HTTP server is configured to execute the script rather than display its contents.

Finally, upload or transfer tb.cgi, header.txt and footer.txt to your Web share. Be sure to transfer any FTP files in text mode, and set the permissions on tb.cgi to 755. If you run into any 500 Internal Server Errors, either the transfer mode or permissions are set incorrectly.

SENDING A PING

You may already know of several sites that accept TrackBack pings. If not, browse the most popular blogs chart at www.technorati.com. Choose an entry you can legitimately write about and make a note of its TrackBack Ping URL. You'll need that URL to send a ping.

Use a Web browser to open tb.cgi, with the correct query string appended to the address:

```
tb.cgi?__mode=send_form
```

Specifying this exact query string prompts the script to switch into "send mode", causing a form to be displayed in the browser window. In the first field, type or paste the ping URL you want to send



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#0308D

► **Post-it:** the standalone tool includes a form for sending TrackBack pings.

information to. Insert details of your Web page including its title, permanent address, and an excerpt of what you have to say.

Once the form is submitted successfully, the details are logged and processed by the remote server. If you refresh the comments list, TrackBack will appear there. If the site admin moderates new comments, there may be a delay.

Avoid comment spamming and nonsensical or empty pings. If you want to run a test, send one to your own Web site first so you can get the hang of the process.

RECEIVING A PING

Decide on a set of unique identifiers for your site's contents. If each page contains a single item or entry, the filename or URL can act as the TrackBack ID. Otherwise, some other randomising factor such as time of first publication or serial numbering can be used.

Here is an example of a TrackBack URL made with a simple serial number scheme:

```
yoursite.com.au/cgi-bin/tb.cgi?tb_id=item0001
```

It doesn't matter what the IDs are. All that matters is that you know which ID goes with which page, since the same identifiers used to store the pings are needed to retrieve and display in list form. Once the ID scheme is set, advertise the TrackBack Ping URL for each page by including it in plain text, or as a link.

DISPLAY WHAT YOU'RE GIVEN

The final use for `tb.cgi` is to display stored data. There are a number of ways to integrate this information into your site, such as a server-side include, PHP include or equivalent. This allows for TrackBack comments to appear inline, on the page they're related to.

```
<!--include file="cgi-bin/tb.cgi" mode=list&tb_id=[TrackBack ID]" -->
```

Alternatively, you can link to the script in list mode and have it open in a separate window:

```
<a href="http://yoursite.com.au/cgi-bin/tb.cgi" mode=list&tb_id=[TrackBack ID]" target="_blank">Check out all my cool TrackBacks</a>
```

If you open the list in a separate window, `header.txt` and `footer.txt` should at least have a basic HTML wrapper and body tag.

AUTO-DISCOVERY

Auto-discovery is a non-essential addition to the framework which allows pages to be scanned for pingable items.

Movable Type's blogging bookmarklet scans for TrackBack IDs and provides a drop-down list of any it finds. This saves bloggers from manually copying and pasting the ping URL when posting a comment.

Auto-discovery works via embedded, non-rendered RDF

Send a TrackBack ping

TrackBack Ping URL:	<input type="text"/>
Title:	<input type="text"/>
Blog name:	<input type="text"/>
Excerpt:	<input type="text"/>
Permalink URL:	<input type="text"/>
<input type="button" value="Send"/>	

(Resource Description Format), a WWW Consortium data type. Use this example as a template, and provide a separate RDF tag for each pingable item on a page (items in bold type are to be set according to your site/entry parameters):

```
<!--
<rdf:RDF xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
  xmlns:dc="http://purl.org/dc/elements/1.1/"
  xmlns:trackback="http://madskills.com/public/xml/rss/module/
trackback/">
<rdf:Description
  rdf:about="["Entry Permalink]"
  dc:title="["Entry Title]"
  dc:identifier="["Entry Permalink]" />
  trackback:ping="http://yoursite.com.au/cgi-bin/tb.cgi/["TrackBack ID]"
</rdf:RDF>
-->
```

If you're concerned with XHTML standards compliance, avoid this method. Even though the RDF itself is harmless, page validators baulk at it, since it's not proper XHTML.

LOST IN TRANSLATION

TrackBack ping URLs are fairly ugly, at least in their default form. They can be cleaned up with a quick and dirty `mod_rewrite` application — all you need is `mod_rewrite` and an `.htaccess` file (for Apache, or their equivalents on other platforms). The idea is to translate incoming requests so that the pings end up where they should without the address.

Here's an example that assumes all your pages are stored in the Web root directory, and that the filename is used as the TrackBack ID:

```
RewriteEngine On
RewriteRule ^(.*)/trackback$ cgi-bin/tb.cgi?tb_id=$1 [L, QSA]
```

Note: the rule modifier `L` means that this is the last rule applied (to prevent any possible recursion), and `QSA` stands for Query String Append (just in case any additional variables were passed along).

By placing the rule in the root directory's `.htaccess` file, an incoming request such as:

```
yoursite.com.au/page1.html/trackback
```

will automatically translate to:

```
yoursite.com.au/cgi-bin/tb.cgi?tb_id=page1.html
```

For more on `.htaccess/mod_rewrite`, see APC April, page 132. [\[10\]](#)

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Shape up a model

Bonus CD software

Realsoft 3D 4.2 for Windows, Realsoft 3D 4.5 Special Edition for Linux, Realsoft 3D 4.5 for Windows (trial).



Realsoft 3D takes simple geometric shapes and builds them into complex structures. But as Vesa Meskanen explains, it's not as difficult as it sounds.

The mainstream popularity of movies like *Toy Story* and *Finding Nemo* have thrust 3D modeling into the public spotlight. While the graphics houses responsible for the production of these films are packed with professional modellers and expensive hardware, the power of modern PCs means that similar results can be achieved on a home computer.

Realsoft's 3D makes modelling a scene consisting of a large number of simple geometric elements is a straightforward task. The base geometry repeats itself and forms a fractal shape. This method can also be used to generate a wide range of effects and models.

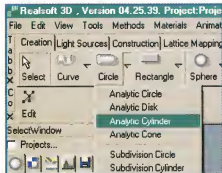
GETTING STARTED

Install and load Realsoft 3D from this month's cover CD set. This simple project won't involve animating a model or using exact coordinates, so close the animation bar at the bottom of the screen by hitting F7, and the numeric window by hitting F8 to maximise the View window's work space.

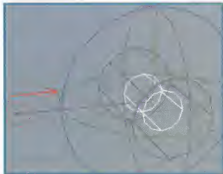
CREATING A TUBE ELEMENT

Our first task is to create a tube-like element by drilling a hole through a cylinder with a smaller cylinder. Realsoft 3D supports mathematically defined, curved geometry objects and construction history for Boolean operations. This means that instead of using hundreds of polygons, a tube can be modelled with just two centre axis directions and radius values. The efficiency factor is important, because you may want to add tens of thousands of tube elements into the scene.

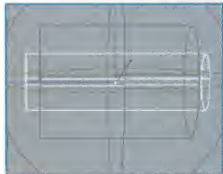
First, hit the blue N button in the view control bar (at the right edge of the screen) to take a front view towards space origin. Click the triangle at the right of the circle icon in the toolbar. From the drop-down menu, select Analytic Cylinder. ①



① **Tools to live by:** the Analytic Cylinder Tool is just one of Realsoft's 3D construction aids.



② **Honey, I shrunk the cylinder:** shrinking the inner cylinder is as easy as click-and-drag.



③ **Room to grow:** the inner cylinder should be slightly longer than the outer one.

Move the cursor over the blue View window. Click once to define the middle point of the cylinder. Move the cursor and click a second time to define a radius.

Examine the new cylinder object on the View window using the view navigation controls. Rotate around the object by holding down the Alt key and right mouse button and moving the cursor. Similarly, right-click-dragging while holding down the Shift key zooms the view for a bigger/smaller view of the work space. Right-click+Ctrl pans the view sideways, up and down. Hitting the blue N icon in the view control bar brings you back to the front view towards space origin.

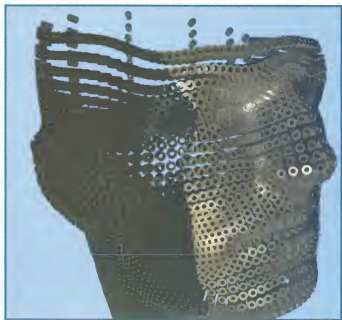
Go to Edit > Duplicate and a second cylinder appears in the Select window's object hierarchy. Move the cursor over the small knob at the end of the red axis line (also called "scale handle"). Press Shift and left-click-drag it towards cylinder's centre. The duplicate shrinks symmetrically. When the radius is about half of the original, release the mouse button. ②

On the view control bar, hit the icon showing the side of a camera to take a side view. Now drag the blue scale knob away from the cylinder centre to make it longer. Don't use Shift this time because it forces symmetric resizing. Make the inner cylinder slightly longer than the outer cylinder. ③ If you make a mistake using the scale handles or any other operation, just select Edit > Undo.

Now it's time to perform a Boolean operation. In the leftmost Select window, click the upper cylinder name first to select it. Press Shift and click the lower cylinder name. This selects both cylinders. The order is important: drilling target first, the drill second. On the toolbar, switch the Construction tab to the front, and click the Boolean icon. The second toolbar row now shows some options: one of them is Operation. Click the third operation type from the left, AND NOT. Note that option controls have tool tips which help the selection. Click Accept to finish the Boolean tool. ④

The object hierarchy on the Select window has changed slightly. Click the box at the left side of the new hierarchy level to open the hierarchy. You can find the original cylinders — Boolean parameters — inside the level object. Realsoft 3D manages the geometry

► **From humble beginnings:** the final product consists of thousands of tubes, plus shading and lighting effects.



database automatically this way, using a hierarchical tree structure.

Rename the Boolean level, which now has the somewhat cryptic name "cylinderxx&cylinderxx", by slowly double-clicking the Boolean level on the Select window. This activates the rename tool. Name it "tube" and hit Enter.

Because of the high number of elements needed for fractal shapes, the real-time geometry drawing needs to be optimised. Make sure Boolean level, containing the two cylinders, is still active. If not, click the name on the Select window. Choose Properties, or hit the letter "p" on your keyboard, and go to the rightmost Wire tab in the window that opens. Activate the option AND Wireframe Off to deactivate the computation of a modified wireframe representing the Boolean drilling.

Activate the upper cylinder using the Select window. Switch the Object Property window to leftmost Gen tab and clear the first option — Invisible in real time drawing. Go back to Wire tab and move the sliders Curve quality, Wire Density and Shaded quality to value 1 and then close the Properties window. Note how the cylinder wireframe has become blocky, just like a cube, but is still a perfect tube. Click the Ray Trace icon on the view control bar (or hit "0") to verify this. ④

The outer cylinder surface of the tube is now being used, with minimal draw quality, to represent the building block. All details are hidden for efficiency.

Finish the tube construction by closing the sub hierarchy of the Boolean level on the Select window. To do this, click the same square at the left of the level icon which opened the hierarchy. At this point, you may also save the project. Select File > Save As from the pull-down menu, enter a suitable file name such as "tube" and hit OK.

FILLING A SURFACE

Now it's time to construct a human face by building it from thousands of tube elements.

The first step is to position the offset point for the tube. This point will be used when placing elements on a target surface later.

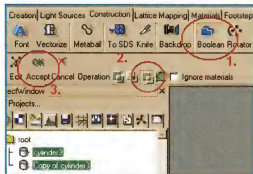
In the meantime, hit the default view icon, N and select the tube. The object handles — which were used earlier to scale the drilling cylinder — are dislocated from the actual geometry. To make repositioning easier, turn off perspective camera using the view controls. The button for this is fourth item down from the N icon. Alternatively, you can press the "*" key to toggle perspective on and off.

Hit the "m" key to activate the move tool. From the second row of the toolbar, select target=Handles. Click in the middle of the dislocated handles to grab them, move the cursor until the handles are positioned over the tube wireframe and click a second time to finish moving. ⑤

Take a side view and make sure that the object handles are also located appropriately in the depth direction. If not, repeat the handle move steps above.

To save some modelling work, load a face surface template from Realsoft 3D's object library. From the Select window's pop-up menu, choose Paste from file. Select the file realsoft3d/Samples/NURBS/head.r3d and click Open.

Rescale the head and tube so that head diameter is at least 10



④ **It's all moths to me:** Realsoft 3D supports a range of mathematically defined operations, including Booleans.



⑤ **Look at the big picture:** although the wireframe looks like a cube, the actual rendered shape is a cylinder.

times greater than the tube diameter. Remember that you can scale the objects uniformly by Shift-dragging the scale knobs of the object handles or by using the Size tool, located in the toolbar's Creation tab.

Click the tube object on the Select window. Then, while holding down the Shift key, click the head object to multi-select it. Again, selection order is important. Go to the Lattice mapping tab of the toolbar. Activate the Distribute tool. Set Count U (vertical density) to 30 and Count V to 60 (integers are examples only). If your computer is fast and you have lots of memory, you may use higher values, such as $50 \times 100 = 5000$ tube elements. Set random=0 to achieve a regular, curvature aligned distribution. Click Accept and wait until the tool finishes its job.

Choose the original head object from the Select window. The second row of the toolbar shows the RT-invisible icon. Turn the option on; it makes the head invisible in ray tracing. Hit 0 to render the view. If you aren't happy with the density or size of tubes, select Undo and adjust the objects before applying the distribute tool again. If the result is good, delete the head template.

Now the Select window shows a long list of tube duplicates. Click the first one to activate it. Hit Ctrl+A to select all duplicates. Open the Select window's menu and choose Drop to a level. This operation creates a new hierarchy level and places all duplicates into it, hiding the complexity.

Next, apply a material to the model. Make sure that the new hierarchy level, including thousands of tubes, is still selected. Switch to the second tab of the Select window, which contains the material library. Find Steel and drag-and-drop its icon to the View window. The material is assigned to the selected object. Now the second building block, a head consisting of tubes, is ready.

FINISHING THE SCENE

Take a top view and zoom out of the View window to see a large area around the head. Go to the Light Sources tab of the Select window and activate the Point Light tool. Click somewhere in front of the head object, move the cursor slightly towards the head and click for a second time to finish the tool. A light source appears.

Switch the Select window back to the leftmost tab (object hierarchy). Open the Property window ("p") and go to the Spec tab. Increase the Intensity from 0.5 to 1.0. Then go to the Col tab and change the colour from white to orange ($R=1, G=0.8, B=0.5$). This creates a warm, sunset-style lighting.

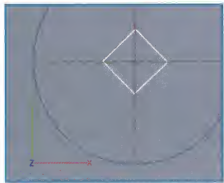
Now to add some fog to the atmosphere. Go to the second tab of the selection window; it includes the material library. Select New > VSL material. A blank material is added to the library. On the Property window, change the name of the material to Fog. Choose Fog from the wizards list and hit Add. This operation inserts fog-related shaders into the material. Change fog colour to pale blue ($R=0.6, G=0.8, B=1.0$) and density to 0.5.

Now is a good time to take a quick look at the programmable shading system of Realsoft 3D. Set the Advanced option to see the structure of the material. The shading tree defines a compact algorithm, defined using the specialised Visual Shading Language (VSL). VSL instructions define how the light changes as it passes through the fog. With VSL, you can customise the whole rendering pipeline. This time, however, we'll only customise shadow casting of the fog.

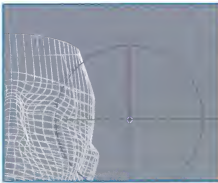
Scroll down in the shader tree and find the lowest level structure called Volume Filtering. Click to activate it and select Delete from the pop-up. This optimisation speeds up rendering.

Now we can add the atmosphere fog. Click the Atmosph tool on the Light Sources tab of the toolbar, select Fog from the material list and click the Accept button. Test render the View window and if necessary, adjust fog colour, density and other scene elements to get a good result.

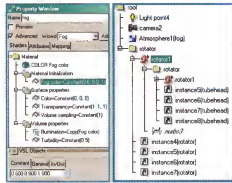
On the leftmost tab of the Select window, activate the head object. Take a top view, go to the Construction tab of the toolbar and activate the Rotator tool. Set the Count value on the toolbar to 6; other rotator options may remain as set by default. Click on the View window to define an axis around which head duplicates will be generated. This produces a circle of heads, multiplying the scene's complexity. You can adjust rotator options, such as copy count and angle between copies using the Spec tab of the Property window. If this still isn't enough, use the rotator system as an element for another rotator or the distribute tool.



6 Get moving: manipulating the handles is a simple click-and-drag operation.



7 Big headed: the tube and head are resized on ready for surface filling operation.



8 Mist: VSL structure of modified fog. **9** Rotation: Multiple layers of rotators.

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Privacy is key

Data protection is equally important for home and business users. **David Emberton** unlocks the secrets of Norman Privacy 3.0, free on this month's cover CD.

In an age where hacking and identity theft are commonplace, people need to be more cautious about the sensitive information they share over Instant Messaging (IM) networks and store on their computers. Norman Privacy 3.0 is an application that can keep your data safe by providing an efficient system-wide encryption and decryption service. It supports multiple users and works on files, directories and the clipboard.

Norman recommends 448-bit Blowfish 2.0 for maximum data safety, and its default encryption scheme is a 448-bit algorithm with private keys. This means heavy-duty security — as long as no-one gets hold of your keys. After your keys are created they need to be given to the encrypted files' recipients so they can unlock the content. An encrypted file or directory will be resaved as a new file, with or without the same creation date as the original. Norman also includes options to compress files or folders and to securely delete source files.

To get started, follow the installer instructions on this month's cover CD set. At login, type in the default username **Admin**, and the default password **admin** to access to the administration panel. Switch to the Keys tab and change the Admin user name and password. If you don't do this, any keys you store in the internal database will be open to snooping.

KEEPING INSTANT MESSAGES SAFE

Regular IM networks provide almost no security. Using the Privacy Clipboard Encryption utility however, plain message texts like this:

Hi, how ru?

can become:

```
***Norman Access Control Privacy***
1D0000004E6F726D616E20416365737D1WHF4829458HJSDf8CC9
***Norman Access Control Privacy***
```

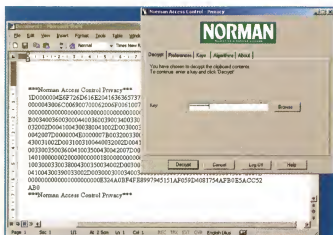
The asterisks are used to detect already-ciphered material, so it can offer to Decrypt Clipboard instead of the usual Encrypt option.

Start by selecting text in an IM window, then hit Ctrl+X to cut it to the clipboard. Click the Clipboard Encryption icon in the system tray and choose Encrypt Clipboard from the pop-up menu. The Privacy window appears, asking for a key. Type a key, click the Encrypt button, then paste back the result. It's normal for the scrambled message to be longer than the original text, even if the compression option is checked.

Ensure the recipient has a copy of Norman Privacy too. Provide them with the decryption key and they can use their own clipboard utility to reveal the plain text. This method can be also used with email and word processing.

Bonus CD software

Norman Privacy 3.0,
Norman Personal
Firewall 1.3, Norman
Personal Firewall 1.4 (trial),
Norman Virus Control 5.7 (trial).



► **Lock down:** keys encrypt the clipboard's contents.

FILE AND FOLDER PROTECTION

To lock down files and directories, fire up Windows Explorer, browse to any document or folder and right click on it. In the context menu, select Norman Privacy > Encrypt File > Directory. The program prompts for an output file location and a key. By default, the file saves in the same location with an extension (.Encrypted) tacked on the end, but its name and location are up to you.

For time-sensitive content, click the File expires box and use the calendar control to select an appropriate lock-out day. Hit Encrypt to complete the process.

If the recipient of an encrypted file doesn't have Norman Privacy installed, right click the target in Explorer and choose Norman Privacy > Create EXE. The options are the same as before, but this time a self-decrypting program is generated. The result is larger, taking into account the software engine, but it's viewable on any Windows system.

KEEPING A KEY DATABASE

Casual users of Norman Privacy can memorise a handful of keys and enter them manually. However, the Keys Database is a better solution for keeping track of large numbers of unique keys.

The database is broken up into Users, one for every Privacy user on a given workstation. Each user can have one or more profiles, like clutches of related keys (Work, Family, and so on). Keys are stored inside the profiles in the form of aliases. Aliases are browsed at the time of encryption or decryption, and selected in place of the keys.

Since you have to log in to Privacy before using it, the keys should be safe most of the time. You also have the option of setting up a log on dialog for each access to the Keys Database.

To store a selection of keys, open the admin panel, click on Keys and select the user. Add a new profile and a selection of aliases: Fred / [key], and so on. Click OK, then encrypt a file. Choose Browse... in the key entry window rather than typing manually. Navigate to the desired alias and the key is automatically entered in the box.

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PC

V8 Supercars 2

Paying \$90 to race at Bathurst is a bargain — Codemasters throws in another 47 locations for good measure. Justin Kranz goes full throttle.

Console versions of V8 Supercars were fun and popular, but the near-identical PC version failed to have the same impact, and was quickly forgotten amongst a welter of other top-drawer racing titles.

While it pays to return to the well for good game ideas, resurrecting an indifferently executed concept is a riskier affair. Admittedly, the previous game's highlights — the abundant Aussie tracks to race on and the stunning graphics — were a real attention grabber for a market starved of local relevance.

Once again, home tracks and superb visual quality are the hallmarks of V8 Supercars 2. The graphics that impressed so much last year have actually been improved. In a nod to such stellar titles as Need for Speed: Underground, there's an increased emphasis on visual effects such as motion blurring. The eye candy serves to mainly remind players that this is more of a fun drive than a simulation.

A highly realistic damage model is again featured — sustained or catastrophic collisions strip your car of essential parts, such as panels, fenders, even wheels.

The critical issue, however, is one of depth. On one hand, V8 Supercars 2 offers plenty of challenges. Following last year's excellent story-based mode, the game steps through 15 different driving styles. Everything from racing on ice through to grand prix racing has to be

negotiated by players in the story-based career mode. In total there are 31 championships to complete, with 35 vehicles to choose from.

Factor in 48 different tracks — including household names like Mount Panorama, Phillip Island and Eastern Creek — and this should, in theory, be an enjoyable way to spend an afternoon or two.

In practice, V8 Supercars 2 employs a simplified arcade control method, meaning that controlling vehicles relies a lot less on smooth, controlled driving than mastering the at-times improbable physics. Once again, certain off-road surfaces have a negligible effect on your car, while others seem to be the equivalent of driving through wet cement. Sticking to the middle of the road is often easier than maintaining a proper driving line, because hammering the brakes mercilessly seems to go unpunished with most modes of racing.

The dumbed-down control is frustrating. Why have a game that looks like a work of art and features a sophisticated damage model with over-simplified handling? Other developers spend time individualising their games between platforms, so that the PC game plays to its own strengths, while the console games play to theirs.

An online multiplayer mode is available, but again, with some excellent simulator-based games on PC offering truly rewarding racing



► Keep on truckin': big or small, the race is on.

experiences, there's little incentive for players to spend time mastering the V8 Supercars 2 craft unless they like being king of an empty server. The situation is a reminder of the differing priorities for console and PC play — PC players have a lot more online options, and so tend to gravitate towards more complex titles. It's a lesson Codemasters is either unwilling or unable to learn at present.

Unfortunately, V8 Supercars 2 is a reprise of last year's outcome: great graphics, interesting storyline-based approach, but a simplified playing experience. The meat of a driving game remains the driving experience. If this aspect fails to fire the imagination, the rest of the game is just window dressing.

Details

Contact	Atari
Online	www.atari.com.au
Price	\$89.95
Verdict	●●●○○

Unreal Tournament 2004

Another year, another Unreal Tournament game. But this time, lack of competition wins the game the first person shooter title by default.

While Unreal II was a lacklustre follow-up to Unreal, the more multiplayer-oriented Unreal Tournament proves exceptional, even though it only progresses steadily from past versions.

Unreal Tournament 2004 employs an older graphic engine, so there's none of the boost in visual quality eye candy fans crave. Instead, the developers have tweaked the core play mechanics. It's a bold move, indicating that the creators are interested in improving the overall experience, not just the appearance of the game.

Extra features can make or break a game for first person shooter (FPS) fans, and this is an area where the developers have excelled. A small range of new weapons have been added. In addition to the existing UT 2003 maps, 20 new maps are included, bringing the number to around 100. And because

the server protocols remain identical, UT 2004 owners can play on UT 2003 servers.

The popular Assault mode from the first UT makes a welcome return. New to the series is Onslaught mode: players capture a series of specified points and when all intervening points between your base and the enemy's are held, destroy the enemy target. It's fun, requires teamwork and works well online.

Controllable ground and air/space vehicles also debut in UT 2004. The arcade-style control requires finesse, and while running over enemy players in a blade-laden jeep may seem unfair, the fact that the vehicles are susceptible to damage makes them a double-edged sword.

Action can now be recorded from the player point-of-view, and an integrated proxy/broadcast system, Unreal TV, caters for broadcasts to large audiences.



► *Crusty demons: old favourites make a comeback.*

Finally, an intelligent voice communications function allows higher levels of organisation for gamers with a microphone.

UT 2004's combination of familiar gameplay, new features and pleasing graphics makes this a compelling purchase.

Details

Contact	Atari
Online	www.atari.com.au
Price	\$89.95
Verdict	●●●●○



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An Introduction to Web Matrix:

ASP.NET Development for Beginners

A beginner's title aimed at those wanting to get started with Microsoft's ASP.NET framework, *An Introduction to Web Matrix* covers the freely available Web Matrix tool (developed by a few enthusiastic Microsoft employees), dealing mostly with the VB.NET scripting language.

Early chapters cover the basics of HTML, form components, interactivity and data validation, leading into coverage of database design and manipulation. Web Matrix is shown in its best light throughout — the authors are obviously big fans.

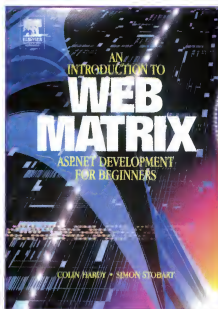
The tone of the writing is very conversational and the open exercises at the end of each chapter are terrific: if readers follow the instructions and complete all the exercises, they should actually gain some useful skills. This includes the ability to invent unique solutions rather than just cutting and pasting code, which is important since this title doesn't include a CD-ROM or Web site support.

Web Matrix is shown to be a capable tool, but the book might as well be a Microsoft Press title for all the balance in coverage. No mention is made of the rationale behind choosing ASP.NET versus other platforms, nor is there any mention of competing tools.

A new version of Web Matrix was released after this book was written, therefore it doesn't cover updated features such as enhanced data access. However, the core functions and community emphasis of the application development tool remain.

Designers and hobbyists working on a Microsoft OS will find this a challenging and rewarding read. Linux/Mac folks wanting to get an overview of ASP.NET development will also find it worthwhile, since it takes a more obtuse approach than the typical online resources. For the price, though, it's a worthwhile purchase.

David Emberton



Details

Publisher	Elsevier Butterworth-Heinemann
Price	\$63.25
ISBN	0750660767

Microsoft Office 2003 All in One

An inherent issue with educational books is that the author is forced to thoroughly explain even the most basic of functions, already known by all but the most amateur of users. This is also true of *Microsoft Office 2003 All in One*, rendering the first few chapters useless.

However, once you get past these, the book delves into areas of the six Office 2003 components (Word, Excel, PowerPoint, Access, Publisher and Outlook) that are unlikely to be known even by advanced users. Think that Word can only be used for typing up the odd report or résumé? This book doesn't waste time showing how wrong you are, covering topics ranging from mail merge all the way up to Web page creation. What's more, this holds true for each of the components covered and contains even more useful information than the Word section.

In addition, *Office 2003 All in One* is predominantly written using a numbered "step-by-step" format coupled with handy screenshots to illustrate pertinent points. It's well composed and constructed, in that it can be consulted at any time with specific queries using the index or contents functions.

At just under 1,000 pages it's a hefty read, but for those after an Office 2003 bible, this book's accessibility and depth are unmatched.

Asher Moses



Details

Publisher	Que
Price	\$59.95
ISBN	0789729369

Mike Meyers' A+ Guide To Managing and Troubleshooting PCs

A book isn't usually the first port of call for tech support. However, *Mike Meyers' A+ Guide to Managing and Troubleshooting PCs* is possibly the ultimate revision tool if you're studying for an A+ certificate.

The book starts with an exercise that enables readers to determine exactly how their study routine should be set out, and estimates the specific areas that each individual should focus on. Although this may appear like a lesson in the obvious, it's a godsend for time-conscious students.

Content-wise, *Managing and Troubleshooting PCs* covers the Core and OS sections of the A+ exam. It also includes over 60 "lab exercises" to ensure readers have a theoretical and practical understanding of the course.

This is an interesting read, thanks to the author's clear and concise writing style. Similarly, the images and break-out boxes are truly invaluable aids in memorising the copious amounts of theory that are fundamental to the A+ course.

Despite being a print publication, the majority of the information presented is current, putting this book head and shoulders above anything else in its field.

Asher Moses



Details

Publisher	McGraw-Hill Osborne Media
Price	\$48.50
ISBN	0072231467

Google, Amazon and Beyond: Creating and Consuming Web Services

Written in frumpy brain-dump style, *Google, Amazon and Beyond* tries hard to be both instructive and inspirational. To a certain extent the book succeeds in its practical aims — it's packed with real examples and code — but the sheer variety of subject matter doesn't make this a cohesive how-to manual.

The book gets off to a solid and promising start: low-level concepts of XML Web services are explained, and the first few chapters show how to build mini applications with the Google and Amazon.com databases. Initial examples are based on a JavaScript library named xmlhttp, switching later to a pure Java focus.

The use of browser-based solutions is welcome, avoiding the need to create entire thin-clients from scratch. On the downside

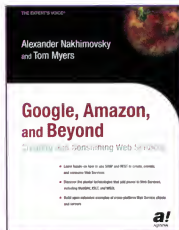
though, xmlhttp will only work on very recent IE and Mozilla-based browsers.

With playtime out of the way, the authors seem to lose direction. The remaining sections are a machine-gun spray of topics including XSLT, DAV, WDSL, Java security, HTTP authentication and more.

Enthusiasts wanting a summary of "the movement" will use these latter chapters as starting points for further research. But the casual reader drawn in by promises of Google, Amazon and Beyond, will find that there's not too much of the "Beyond" here.

No CD is included but source code for the examples and exercises can be found on the Apress Web site (www.apress.com).

David Emberton



Details

Publisher	Apress
Price	\$79.95
ISBN	1590591313

Dr Mac: The OS X Files

Some Mac users resist the switch to Mac OS X for the reason that they rely on a particular program or feature that's only available in classic Mac OS. Others take a personal view: after years of experience they work quickly and productively in Mac OS, and they don't want to go back to being a beginner. Learning the basics isn't enough — and that's where the *OS X Files* comes in with all the tricks and shortcuts needed to power through the day.

The author's expertise combined with hints from the user community (including at least one Australian) fills a gap in the market. *The OS X Files* assumes you already know what you want to do and presents better, faster and easier ways of doing it.

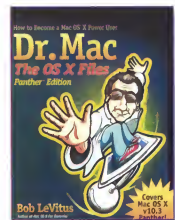
Not all the tips are of the "try this keyboard shortcut" or "drag this onto that" variety. Most experienced users should have already settled

on a backup strategy, for example, but the author's discussions of such topics provide food for thought.

One criticism is that the book hasn't been fully updated for Mac OS X 10.3. For instance, the default Unix shell is now bash rather than tcsh, and there's no mention of Apple's X11 implementation. Also, some of the screenshots are too small to clearly illustrate the features being discussed.

Apart from recommending a slew of third-party utilities (and a few applications), the book focuses on the software bundled with a Mac, so it's relevant to most users. Even if you value your time as low as \$10 per hour, you only need to save three minutes a day to recoup the cover price, and we'd be surprised if you didn't.

Stephen Withers



Details

Publisher	Wiley
Price	\$49.95
ISBN	0764540688

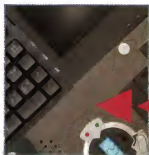
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Anyware	162	Mitsubishi	12
ASUS	43, 45, 47, 49	Mobile Data Technology	174
Australian IT	11	MultipiCD	173
Belkin	73	MSI	133
BenQ	37	National Communications	165
Canon	175, 18C, 18C	NEC	105, 107
Capax	139	PC Range	76
Com-Tek	161	PCI Case	173
Creative Labs	117	Pioneer	66-69
Dell	1FC, 1	Protac	149, 171
Digicolor	38	Qbit Uni of Technology	17
Diskmax	174	Q-Flow	172
Epson	27	Qbit	126
Emagin	155	Shuttle	53
Everything Linux	159	Sony	25
Fortune Tec	170	Toshiba	4, 5
Fujitsu	93	TEG	164
Gigabyte	51	TPG	113
HP	\$5, \$6, \$7, \$8, \$9, \$9	Universal Enterprise	125
Hyku	175	Upgrade Yourself Computers	175
line	176	Verbatim	61
Impact Systems	167	Visionewic	111
Independent Software		Vision Pro	168
Duplication	175		
Inventa	174		

MARKETPLACE 173 to 176

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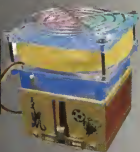
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BC-05	\$50.00	—	BCI-21C	\$28.00	\$6.40
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BCI-3eBK	\$25.00	\$ 8.80	BCI-24C	\$33.00	\$7.20



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51629A (#29)	\$56.00	\$30.50
51645A (#45)	\$56.00	\$28.70
51649A (#49)	\$56.00	\$37.70
C1816A (#16)	\$63.00	—
C1823D (#23)	\$60.00	\$40.50
C6578D (#78)	\$60.00	\$40.50
C6614A (#20)	\$51.00	\$30.50
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Model	Genuine	Compatible
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C8727A (#27)	\$34.00	—
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HP C4096A	\$155.00	\$95.00
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KA-330U



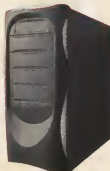
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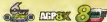
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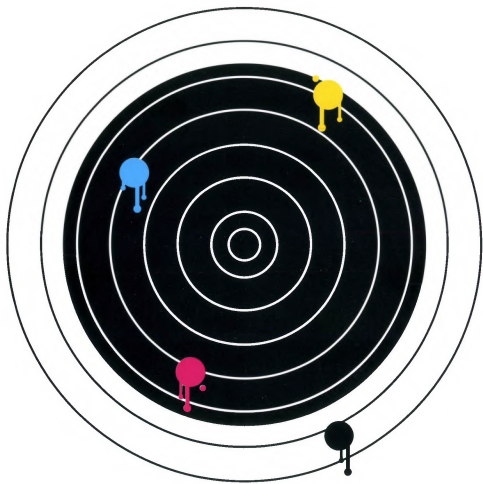
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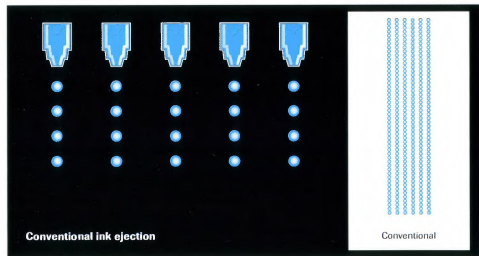
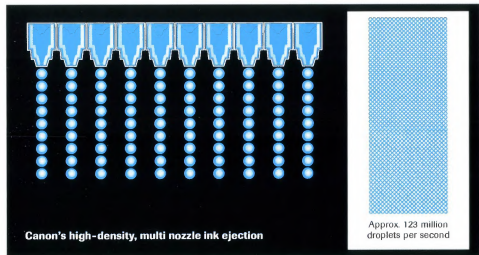
A weakness of conventional printing processes is the accurate reproduction of skin tones. This is just one area in which you'll find MicroFine Droplet Technology has made a dramatic improvement. The new technology accurately targets up to 11.5 million droplets per square inch[†], ensuring greater definition in highlights and the subtleties and variations of tint and tone. The result is truly life-like.

SHARPER PRINTS

Sharpness depends not only on accuracy but on control of the droplet size. With MicroFine Droplet Technology, the droplets measure as microscopic as 2 picolitres each[†]. Put simply, that means they are so small that individually they are invisible to the human eye. And because they are placed with such precision onto the page, graininess is eliminated and the sharpness of the print is greatly enhanced.

FASTER AND BETTER

Amazingly, this new process does not require you to sacrifice speed for quality. Far from it. With upwards of 6,144 nozzles delivering up to 123 million droplets of ink every second[‡], it actually takes fewer passes for the print head to create the image. So you get quality and speed.



You'll find Canon's MicroFine Droplet Technology is a revolution in the process of high quality printing. Not only will your prints be sharper, more detailed and more accurate in their colours, you'll spend less time waiting for them.

Bullseye.

[†]Source: Canon Inc Data

[‡]MicroFine Droplet Technology is available in all Bubble Jet and All-in-One printers except the S200SPX model. Ink droplet size varies from 5 picolitres to as small as 2 picolitres dependent on model. See website for details.



i9950 Bubble Jet Printer
(Available in May)



i865 Bubble Jet Printer



MP370 All-in-One Printer

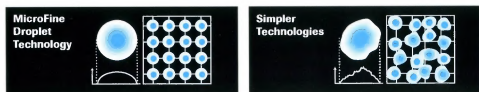


MP370 All-in-One Printer

Canon
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MICROFINE DROPLET TECHNOLOGY™

Print quality depends on accuracy and size. If a tiny droplet of ink doesn't hit the page on target, the image suffers. Canon has now developed a solution to the problem – MicroFine Droplet Technology. This new process is a revolution to high quality printing. It combines breakthroughs in ink droplet size, accurate ink application, consistent quality and speed. The result is spectacular print resolution and image quality, delivered faster.

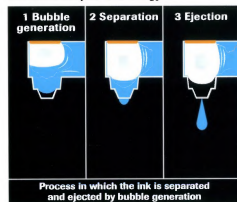


PRECISE INK EJECTION

When ink droplets are reduced to ultra-fine volumes, any irregularities in the volume of the ink droplets ejected from a nozzle can produce unevenness in the image. Therefore the ink droplets ejected from all nozzles must be of a prescribed circular shape and volume. Also, printed dot placement will be inaccurate unless the droplets are ejected straight, minimising the effects of air resistance.

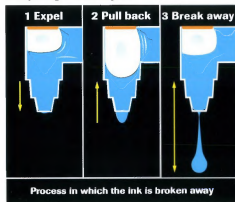
Canon's MicroFine Droplet Technology overcomes the problem of inaccurate dot placement by attaching a heater near the print nozzle opening. As the droplets leave the heated nozzle tip they are of uniform size, shape and encounter minimal air resistance. They reach the page with far greater accuracy than competitors' technologies creating an extremely high quality print.

MicroFine Droplet Technology



- (1) A bubble is generated.
 - (2) A prescribed volume of ink is separated by the bubble.
 - (3) The separated ink droplet is ejected.
- A heater is fitted to the reduced-size nozzle tip. The ink ejection opening is positioned immediately below the heater.

Competing Technologies



- (1) Ink within the nozzle is pressurised, pushing it towards the ink ejection opening.
- (2) The ink is then pulled back inside the nozzle.
- (3) This breaks away the expelled ink.

MICROFINE PRINT HEAD

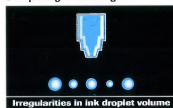
In order to create the precision of MicroFine Droplet Technology we created a microscopic nozzle opening for precise firing and controlled placement of small ink droplets. Canon's print heads are as small as 10 microns, with an opening that is less than half the width of a single human hair. This nozzle opening is significantly smaller than competing print head nozzle structures and ensures the droplets fired are small and consistently shaped for outstanding print quality.

Apart from size, our photolithography manufacturing process produces high-density nozzle arrays that can print complex images. We arrange thousands of print nozzles with a short pitch – the distance between each nozzle. With a small nozzle opening and nozzle pitch of 1/1200 inch (versus competitors 1/180 inch or 1/600 inch pitch), Canon's range of printers delivers high-resolution printing in a single pass enabling high-speed printing.

MicroFine Droplet Technology



Competing Technologies



Canon's Individual Ink Tank System



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